

**US Army Corps
of Engineers®**
Albuquerque District

Environmental Assessment

**For the
Galisteo Dam and Reservoir Salt Cedar Eradication Project,
Galisteo Creek, Santa Fe County, New Mexico**



Prepared by

**U.S. Army Corps of Engineers
Albuquerque District**

March 7, 2006

**U.S. ARMY CORPS OF ENGINEERS
ALBUQUERQUE DISTRICT**

**FINDING OF NO SIGNIFICANT IMPACT
for the
Galisteo Dam and Reservoir Salt Cedar Eradication Project
Galisteo Creek, Santa Fe County, New Mexico**

The proposed action would remove salt cedar and Russian olive over the 212 acres upstream of the Galisteo Dam and Reservoir (Dam) using mechanical extraction. All roots and stumps would be removed, where possible. Piles of the removed trees would be burned on site. The area would be revegetated with shrubs and grasses native to the area. The approximate total cost of the project is \$642,500.

Alternatives considered included aerial herbicide application to the salt cedar or hand removal. Aerial herbicide application was an option that was protested by the citizens living in the area and was therefore no longer considered. Hand removal is extremely time consuming and costly and was also no longer considered. The other alternative considered was No Action.

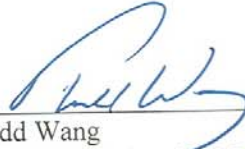
The purpose of this project is for maintenance of the Dam and to decrease the tree debris that moves into and blocks the trash rack of the outlet structure. Also, left untreated, the salt cedar and other non-native species would continue to out compete and crowd out the native vegetation at the site. Within the Galisteo Reservoir Project area, wet meadow habitat with native cattail, rush and willow exist. If the non-native vegetation were left untreated, it would continue to expand into these wet meadow areas and become established. Galisteo Creek would also continue to provide a seed source of salt cedar and Russian olive to downstream areas. The density of the stand would also continue to increase causing an increased fire hazard. Native wildlife species in the area would also continue at a minimum level since native species have been shown to prefer native habitat.

The planned action would result in only minor and temporary adverse impacts on air quality, soils, aesthetics, vegetation, wildlife, recreational resources, water quality, and noise levels during implementation. The long-term benefits of the proposed project would outweigh these short-term adverse impacts. The following elements have been analyzed and would not be significantly affected by the planned action: socioeconomic environment, air quality, hydrology and hydraulics, water quality, noise levels, floodplains, wetlands, waters of the United States, biological resources, endangered and threatened species, prime and unique farmland, and cultural resources.

The Clean Water Act (CWA) provides for the protection of waters and wetlands of the United States from impacts associated with discharges of dredged or fill material in aquatic habitats, including wetlands, as defined under Section 404(b)(1). All work associated with the project would be accomplished outside of aquatic areas regulated by this law. The Corps Environmental Resources Section has coordinated with Corps Regulatory Division regarding this project and it was determined that the project is not regulated under the provisions of Section 404 of the Clean Water Act and a Department of the Army permit would not be required.

The planned action has been fully coordinated with Federal, State, tribal and local governments with jurisdiction over the ecological, cultural, and hydrologic resources of the project area. Based upon these factors and others discussed in the Environmental Assessment, the planned action would not have a significant effect on the human environment. Therefore, an Environmental Impact Statement will not be prepared for this project.

3/1/06
Date



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Environmental Assessment
For the
Galisteo Dam and Reservoir Salt Cedar Eradication Project,
Galisteo Creek, Santa Fe County, New Mexico

1.0 INTRODUCTION

1.1 Project Location and Background

The Galisteo Dam and Reservoir is located in Santa Fe County, New Mexico and approximately 20 miles south of the City of Santa Fe. The Dam located on Galisteo Creek (Creek), approximately twelve miles upstream from the confluence of the Creek with the Rio Grande (see Figure 1). Access to the Dam can be attained by traveling 4.6 miles from the intersection of access road 16 and I-25 (Exit 247) on USACE access road 16.

Construction of Galisteo Dam and Reservoir (Dam) began in 1967 and was completed in 1970 as a unit of the comprehensive plan for flood and sediment control on the Rio Grande and its tributaries as authorized by the Flood Control Act of 1960 (Public Law 86-645). The embankment and spillway were modified in 1998 to assure its ability to accommodate the Probable Maximum Flood without overtopping the dam.

The Dam project consists of 3,753.38 acres with 1,171.69 acres in the form of flood control flowage easements. Approximately 500 acres of riparian habitat exists on either side of the Dam within the project land owned by U.S. Army Corps of Engineers (Corps). Approximately 75% (212 acres) of the riparian habitat is non-native vegetation, mainly salt cedar (*Tamarix ramosissima*) but also including some Russian olive (*Elaeagnus angustifolia*). Salt cedar has been shown to utilize more water than native riparian vegetation (Cleverly et al., 2002; Dahm et al., 2002 ; Goodrich et al., 1998; Stromberg, 1998; Hanson, 1991), and has a lower habitat value for wildlife than native species (Hink and Ohmart, 1984). Efforts throughout the Rio Grande basin and other waterways throughout the country have begun to eradicate non-native species from riparian areas to restore a native ecosystem. Ecosystem restoration is a primary mission of the Corps.

1.2 Project Costs

The approximate cost of the project is approximately \$642,500 and is broken down among the various features as follows:

Project Feature	Estimated Cost
Mechanical extraction of non-native vegetation	\$300,000
Burning of piles	\$22,500
Herbicide treatment (Years 2-5)	\$60,000
Revegetation	\$260,000
TOTAL ESTIMATED COST	\$642,500

1.3 Purpose and Need

The objectives of the project are to extract non-native salt cedar and Russian olive from 212 acres upstream of the Dam for maintenance of the Dam and Environmental Stewardship (see

Figure 2). Debris upstream of the Dam clogs the trash rack and this project will help prevent debris build-up in the trash rack.

1.4 Related Activities

Other efforts along the Galisteo Creek watershed are underway to eradicate non-native plant species. The Pueblo of Santo Domingo has lands within the Creek downstream of the Corps' project area. Approximately 500 acres of salt cedar and Russian olive were treated with aerial herbicide in 2003. The aerial herbicide treatment killed a majority of the trees, which will be removed by the Pueblo. Efforts upstream of Galisteo Reservoir are underway through the Galisteo Watershed Partnership, which has many projects on private properties to thin or treat non-native vegetation in various ways. Many efforts are being coordinated through the Galisteo Watershed Partnership (GWP) in order to plan for improvement of the watershed and benefit each other's efforts. The GWP was spearheaded by the Earth Works Institute, a non-profit group, and interested parties throughout the watershed. The Corps and many other state, local and federal agencies have signed on to participate with this group in order to better coordinate restoration efforts on the watershed.

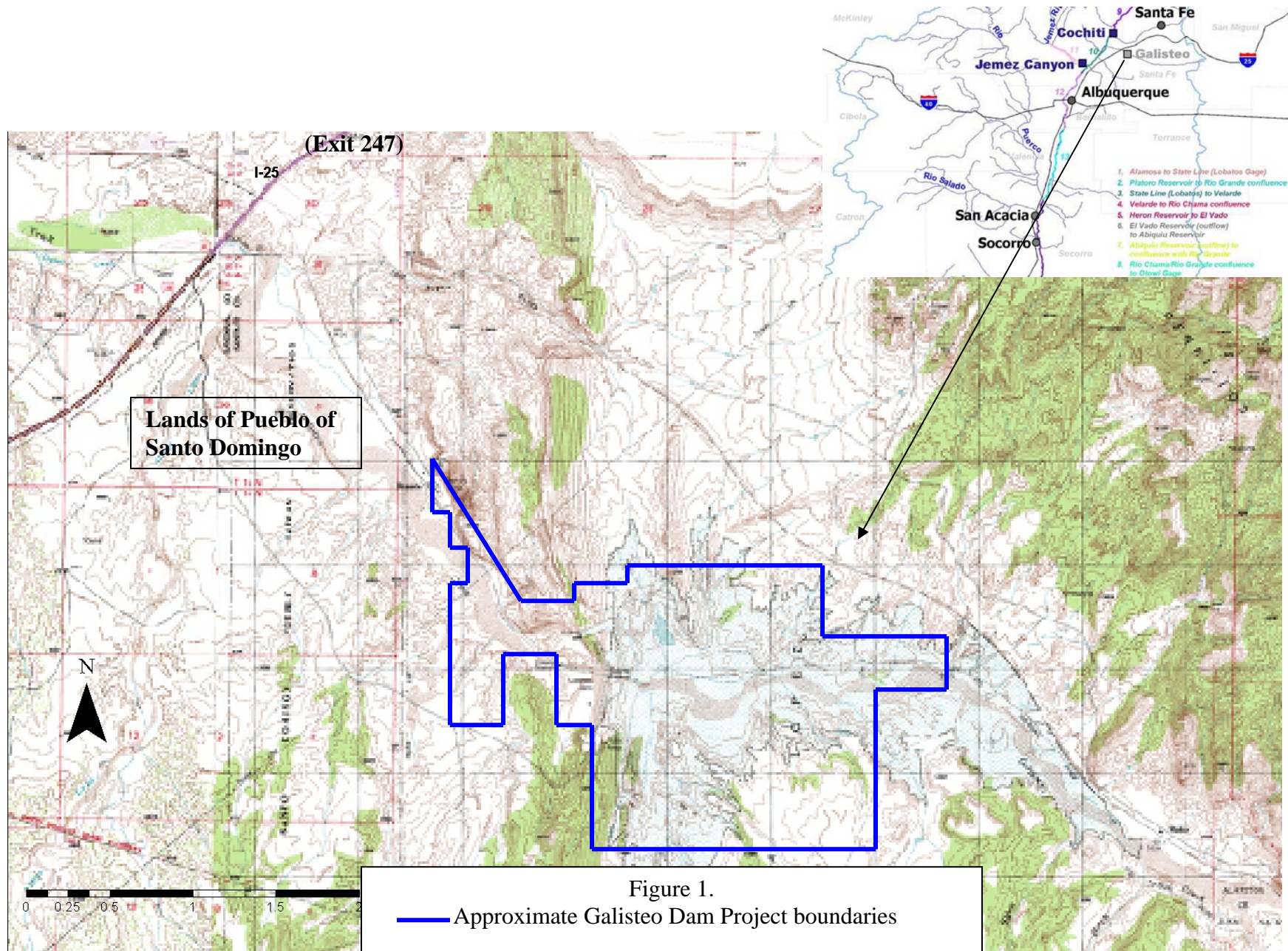
1.5 Regulatory Compliance

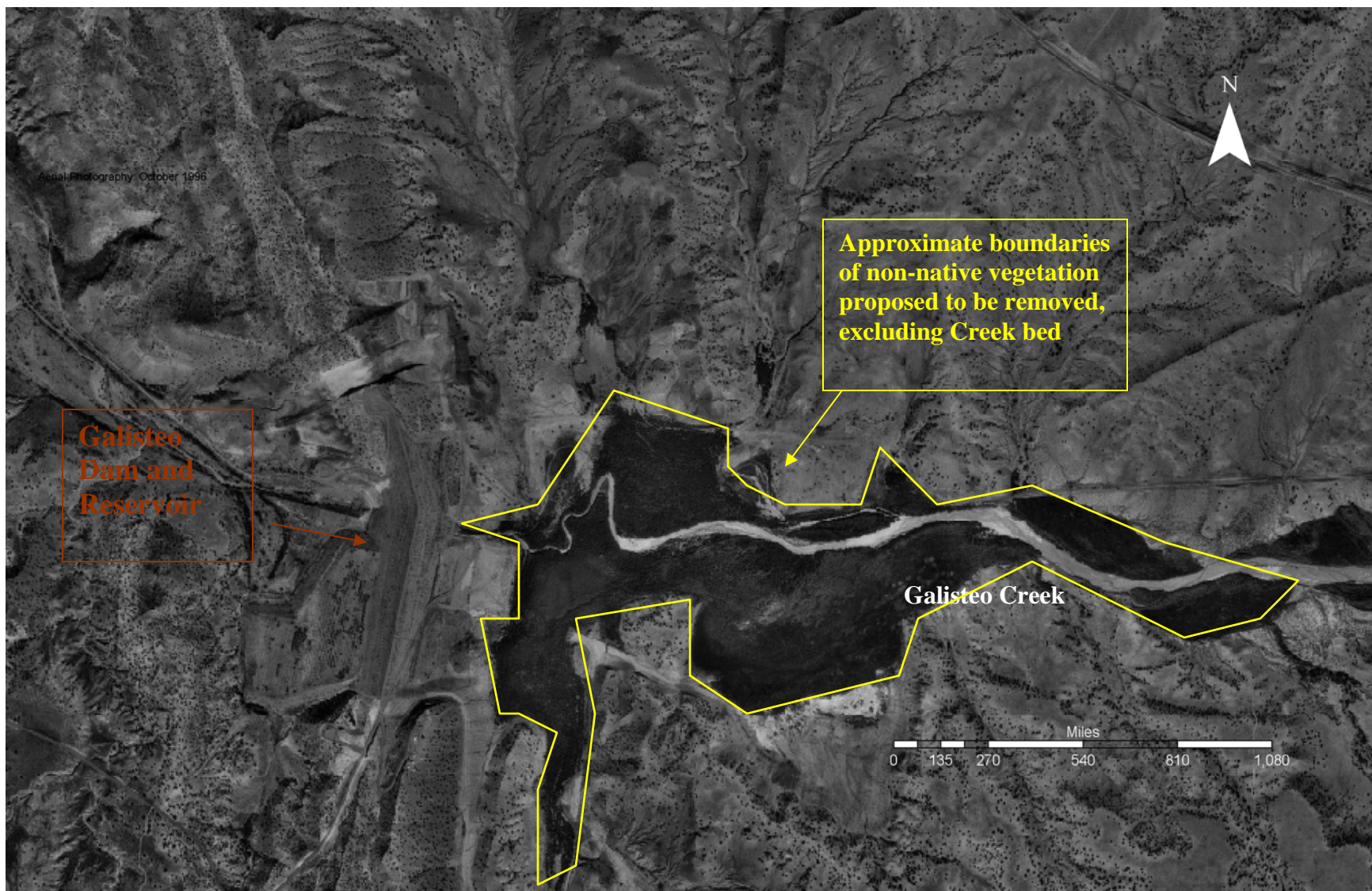
This Environmental Assessment (EA) was prepared by the U.S. Army Corps of Engineers, Albuquerque District in compliance with all applicable Federal statutes, regulations, and Executive Orders, including the following:

- Clean Air Act of 1972, as amended (42 U.S.C. 7401 *et seq.*)
- Clean Water Act of 1972, as amended (33 U.S.C. 1251 *et seq.*)
- Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*)
- National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 *et seq.*)
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 *et seq.*)
- Procedures for Implementing NEPA (33 CFR 230; ER 200-2-2)
- Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (Executive Order 12898)
- Farmland Protection Policy Act (P.L. 97-90)
- Floodplain Management (Executive Order 11988)
- Protection of Wetlands (Executive Order 11990)
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470a *et seq.*)
- Protection of Historic Properties (36 CFR 800 *et seq.*)
- Protection and Enhancement of the Cultural Environment (Executive Order 11593)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 *et seq.*)
- Archeological Resources Protection Act of 1979 (16 U.S.C. 470)
- Environmental Justice (Executive Order 12898)
- Federal Weed Act of 1974 (Public Law 93-269; U.S.C. 2801)
- Migratory Bird Treaty Act of 1918

This Environmental Assessment also reflects compliance with all applicable State of New Mexico and local regulations, statutes, policies, and standards for conserving the environment

and environmental resources such as water and air quality, endangered plants and animals, and cultural resources.





Aerial photography: October 1996

Figure 2. Location of salt cedar and other non-native vegetation to be treated.

2.0 Description of Alternatives and Proposed Action

2.1 Proposed Action

Mechanical extraction of 212 acres of salt cedar and Russian olive. Maintenance of resprouts. Revegetation of area with native grass, shrubs and trees.

Phase I: Mechanical extraction

Under this alternative, salt cedar and Russian olive would be controlled over the 212-acre project area upstream of the Dam using mechanical extraction. Much of this area is on the south side of the Galisteo Creek and a tributary arroyo. All roots and stumps would be removed, where possible. Mechanical extraction is completed by using an extractor bucket attached to a track vehicle either on large tires or tracks (see Figure 3). The entire tree including the root system is pulled out of the ground. As much as possible, all root pieces must be removed from the ground. This method allows for rapid and efficient widespread treatment of non-native vegetation in areas of largely monotypic stands. This methodology would be used in the proposed project area where a large stand of 4-to 6-foot-tall salt cedar has been established.

This action would be timed to result in the least impact to nesting bird species. This phase would take place between September and March of 2005-2006, 2006-2007, and 2007-2008. The first parcel (shown in blue) would be treated in Winter 2006, is approximately 75 acres, and is located on the south side of the Creek just east of the Dam (see Figure 4). The remaining 137 acres are divided into two other parcels that would be treated in consecutive years. Parcel 2 (shown in red) is approximately 75 acres in size and would be treated in the Fall/Winter 2006-2007. Parcel 3 (shown in yellow) is approximately 62 acres in size and would be treated last (Fall/Winter 2007-2008).



Figure 3. Mechanical extraction in the bosque in Albuquerque, NM.

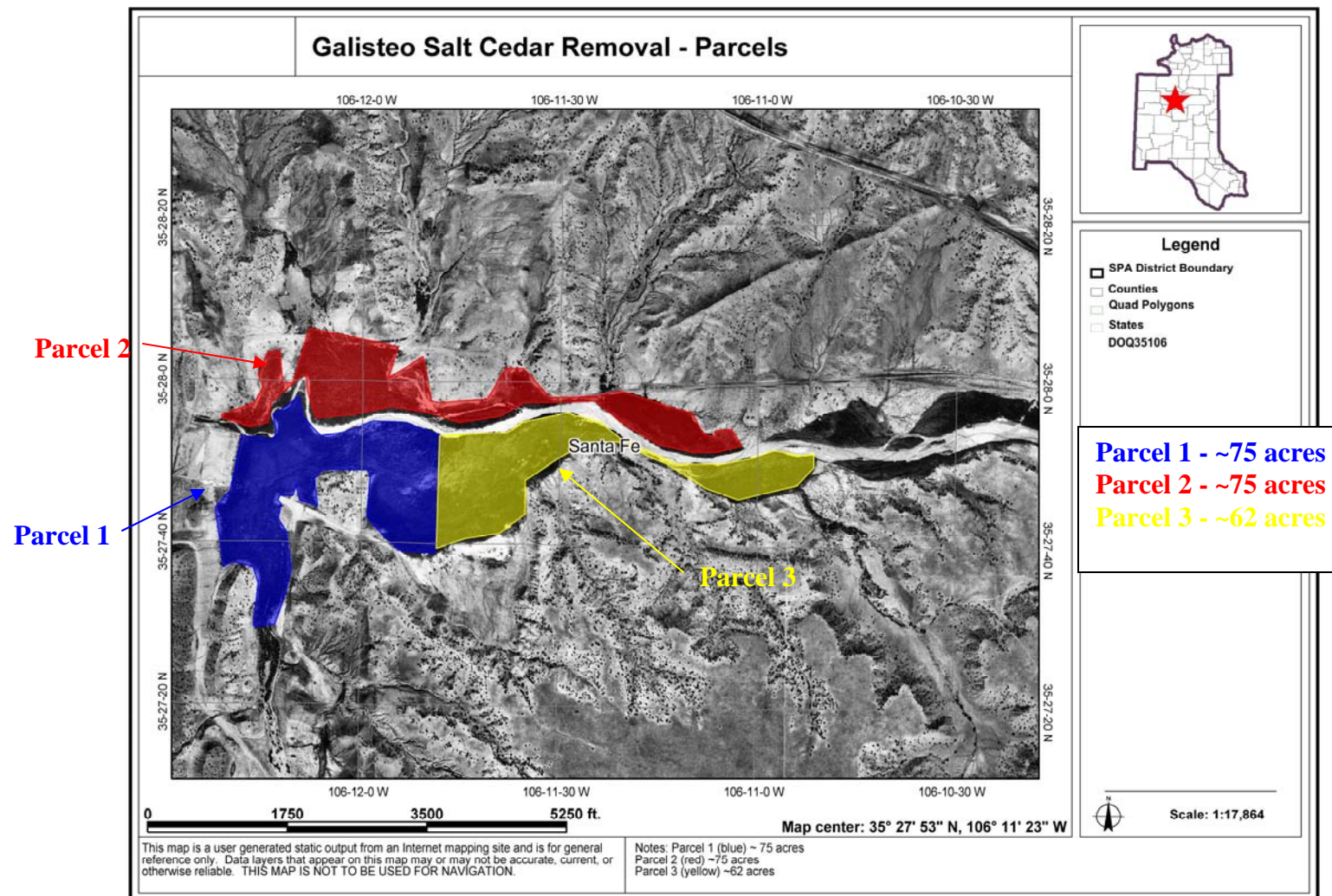


Figure 4. Parcels to be treated over 3-year period.

Phase II: Burning of extracted piles

Material that is extracted would be piled in order to be burned on site. This is the most efficient way to process the material. Options for burning are to burn the piles on the ground or to dig a hole in the ground and place the material inside and then use what is called an air curtain burner to allow the material to burn faster inside of the hole. The latter would create less smoke and less cleanup. Burning options are further evaluated below. Some material may also be bucked into firewood to be distributed to local communities. Some material could also be chipped and used on site for mulch.

Phase III: Maintenance of resprouts

Mechanical extraction allows for removal of all parts of the trees though some root pieces are bound to remain after treatment, allowing for some resprouting to occur. Resprouts would be monitored and treated 1-2 times a year. Initially, local goats would be used to treat the resprouts. They would be allowed to browse in small areas that are fenced off and rotated throughout the treated block. Since goats cannot distinguish between species, they would only be able to be utilized until native vegetation is well established. Once native vegetation is well established (see next section), resprouts would have to be treated with herbicide by using a backpack-mounted sprayer. This would allow treatment of the specific non-native resprouts but protect the native vegetation. If native vegetation successfully outcompetes non-native resprouts, then herbicide would not be used.

Phase IV: Revegetation

It is anticipated that some natural revegetation would occur in the treated stand if there is adequate precipitation. For example, past experiences in the Upper Rio Puerco watershed has shown that the riparian areas normally re-vegetate naturally within two years following treatment (USDOI-BLM, 2002). Existing vegetation, topography, soil texture and salinity, and ground water elevation would be utilized to determine optimum locations for native riparian vegetative communities. Since not all areas would revegetate on their own, seeding of native grasses and shrubs would supplement revegetation efforts. Seeding will also include the application of mycorrhizal fungi to assist with soil health. Native grasses and shrubs appropriate to the area would also be planted once Phases I and II are complete.

Benefits

Long-term benefits resulting from the proposed project include potential water savings, potential decreased soil salinity, increased fire protection, increased wildlife habitat value and protection and increased life of the Dam. Benefits to Dam operations include the prevention of large flows of debris from moving through and clogging the trash rack during a large storm event. A dense stand of salt cedar upstream of the Dam currently poses this threat and blockages from limbs falling off of trees currently results in increased maintenance.

As previously mentioned, numerous studies have documented that salt cedar uses more water than native riparian species. In the Middle Rio Grande, dense stands of salt cedar have been shown to have higher evapotranspiration rates than a mature cottonwood stand with a closed canopy (a more typical native riparian habitat) (Dahm et al., 2002). A number of projects and research efforts throughout the Southwest state that salt cedar uses more water than native

southwestern vegetation (Cleverly et al., 2002; Dahm et al., 2002 ; Goodrich et al., 1998; Stromberg, 1998; Hanson, 1991); therefore a potential water gain may be realized as a result of salt cedar removal. Removal of salt cedar and Russian olive, where needed, would also decrease the seed source that affects areas downstream and other native plant communities on the Rio Grande.

Salt cedar is a fire-adapted species and has long tap roots that allows it to intercept deep water tables. Salt cedar disrupts the structure and stability of native plant communities and degrades native wildlife habitat by replacing native plant species, monopolizing limited sources of moisture, and increasing the frequency, intensity and effect of fires. Although it provides some shelter, the foliage and flowers of salt cedar provide little food value for native wildlife species that depend on nutrient-rich native plant resources (Muzika and Swearingen, 1999). Birds prefer to nest in native vegetation that contain their preferred physical structure and food source.

Converting 212 acres of salt cedar and Russian olive to mosaics of native riparian habitat would increase habitat diversity over the entire area. Salt cedar control in mixed salt cedar/native bosque would reduce stress to native species, which are competing with exotic vegetation, and would reduce wildfire hazards (Taylor, 1999). Substrate for native species regeneration within these sites would also be provided as a result of salt cedar control and decreased salinity of the soil. This alternative would increase the production of indigenous species such as salt grass, willow, and native herbaceous species to potentially support greater numbers of native bird species and other wildlife.

This option is also the most cost-effective (see Table 1 below), allowing for full treatment of the non-native vegetation at one time. This option will allow for potential long-term recovery and restoration of the Galisteo Creek in this area. This is the Agency preferred alternative.

Table 1. Cost comparison of Alternatives considered

Methodology	Cost
Mechanical Extraction	\$642,500
Aerial herbicide	\$645,000
Hand removal	\$900,000

2.2 Alternatives Considered

2.2.1 Treat 212 acres of salt cedar and Russian olive utilizing mainly aerial herbicide application.

This method for aerial herbicide application has been utilized for removal of salt cedar in areas along the Pecos River in New Mexico and Texas, the Chico Arroyo Watershed along the Rio Puerco in New Mexico, on Bosque del Apache National Wildlife Refuge near Socorro, New Mexico, and on the Pueblo of Santo Domingo as mentioned above. All areas contained extremely large stands of monotypic salt cedar and/or a mixed salt cedar community in fairly rural areas. Large-scale herbicide salt cedar control usually includes aerial application of a mixture of 64 ounces Arsenal and 32 ounces Nonionic Surfactant at 15 gallons per acre total

mix. Applications are made in early September after the majority of bird species have completed nesting and when herbicides are quickly transported with carbohydrates (via phloem tissues) to the root system of plants for storage. Herbicide application during this time period aids in the control of root resprouting. Milder weather and higher relative humidity encountered during this period also reduces the thickness of salt cedar leaf cuticles allowing easier herbicide penetration.

Two to three years after herbicide application, dead material would be removed and native vegetation planted. The method for removing dead material could include mechanical removal, a prescription broadcast burn, or other methods as deemed appropriate. The area would be monitored during the period after herbicide application for resprouting of non-native vegetation. Resprouts can be treated by hand with herbicide through a backpack sprayer or other container.

Aerial application would be completed by helicopter using a hydraulically driven spray pump attachment. A conventional boom with .028 nozzles produces a uniform pattern of 800 to 1000 micron droplets, which has been proven the most successful in salt cedar control (North Star, 2002). In order to obtain a uniform and accurate application, a GPS unit and a variable rate flow control is used. Avoidance zones are uploaded into the program in order to identify and protect sensitive areas. A mixture of 64-ounce Arsenal and 32-ounce Nonionic Surfactant at 15 gallons per acre total mix is applied during application. Chemical composition and fate is described in Section 3.18 below.

The standing dead salt cedar trees must be left in place for at least 18 months, which also results in an aesthetically displeasing view from the Dam. Treating all 212 acres at once with aerial herbicide could temporarily displace native wildlife present in the area. The dead, dry material that will be left will also create a fire hazard. Under these dry conditions, a fire could easily spread if one were somehow started. Standing dead material also increases the potential for debris to block the Dam's outlet in the event of a flood event.

Communities upstream of the Dam and adjacent to Corps property have voiced concern in using aerial application, as well as the NMED. A public meeting was held on August 14, 2003 where many of these concerns were heard. For all of the reasons stated above, this alternative was not chosen as the Preferred Alternative.

2.2.2 Treat 212 acres of salt cedar and Russian olive utilizing hand removal methods and herbicide treatment.

This method entails crews of workers with chain saws cutting down the stems and trunks of each tree on an individual basis. Herbicide is immediately applied to the base of the tree once the trunk is removed.

This method allows for minimal ground disturbance. Material generated could be bucked up for fuel wood and stems would be chipped on site or hauled off. The long-term benefits are similar to those in the previously discussed alternatives.

This method can be extremely time consuming and costly in comparison to the Proposed Action alternative. Approximately one acre can be treated per day. Treatment of a 212-acre area would

take approximately 20 months to treat by hand. There is only 6 months when this type of work would be performed when nesting birds are not present. This alternative is not time or cost effective and was therefore not chosen as the Preferred Alternative.

2.2.3 No Action.

Under this alternative, the Parcels upstream of the Reservoir would not be cleared.

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3.0 EXISTING ENVIRONMENT AND FORESEEABLE EFFECTS

3.1 Physiography, Geology, Soils

The project site lies at the southeastern margin of the Española Rift Basin and is also associated with the Santo Domingo accommodation-zone basin of the Rio Grande rift (Smith et al., 2001). Landscapes are dominated by eroded, dipping fault blocks, relict basin floor and pediment surfaces, and intrusive igneous features (Doleman and Brown, 2000). The Dam is bounded by the Cerrillos Hills to the northeast, the Ortiz Mountains to the south, and the La Bajada fault scarp on the west.

The entire Galisteo Creek watershed encompasses approximately 730 square miles and ranges in elevation from approximately 10,500 feet in the Sangre de Cristo Mountains to 5,200 feet at the confluence of Galisteo Creek and the Rio Grande.

Geologic sediments in the area are collectively referred to as the Santa Fe group. Soil associations in the area include the Las Lucas-Pojoaque within the Creek bed area; to the south, the Chimayo-Mirabal-Supervisor in the mountains on the north side of the Dam; and, to the east and west is the Travesilla-Rock Outcrop-Bernal association (Folks, 1975).

Characteristic soils within these associations are present in the Dam and Creek area. Soils in the river and on adjacent uplands include Riverwash, which is present in intermittent arroyos and streams with sandy material. Included in this soil type are areas of Bluewing soils, which consist of well-drained soils forming in recent alluvium of mixed origin. Saline alluvial land also occurs in the Creek bed with highly stratified material that ranges from loamy sand to silty clay loam. These are severely erodible soils. Las Lucas loam is present along the banks of the Creek. This soil is well drained and is forming in weathered material. On the hillslopes north and south of the Dam, Travesilla-Rock outcrop complex soils occur. This complex consists of about 50% Travesilla fine sandy loam and 25% Rock outcrop. Runoff from these soils is rapid.

Within the proposed project area, alluvial soils occur as well as Las Lucas loam. Also present in the treatment area is Persayo-Shale rock land association with 60% Persayo channery clay loam and 30% Shale rock. Permeability is moderate in this soil with rapid runoff.

Further upstream, alluvial, Las Lucas loam, and Riverwash soils continue as well as Travessilla-Bernal fine sandy loam and Stony rock land. Downstream of the Dam, river and adjacent upland soils continue as well as Prewitt loam, Galisteo-Gullied loam, Pojoaque-Rough broken, and Pojoaque-Panky associations.

The extent of soil erosion resulting from salt cedar control is influenced by surface soil textures, impacts to the soil, the degree of windiness during the first spring after control, the amount of precipitation occurring the first year after control and timing of revegetation. Sandy soils are particularly erodible during spring wind events. If ample spring moisture occurs during the first year, dense annual vegetation germinates and aids in wind erosion control.

Vegetation removal will cause a direct impact by disturbing soils in order to uproot the trees. The site will be graded after extraction is complete. The area will be seeded and revegetated as stated in Section 2.1 above. There will be initial and temporary disturbance to soils during construction only. All appropriate permits will be obtained.

A substantive change in the volume of sediment moving through the Dam after mechanical extraction of salt cedar is not anticipated. There may, for a finite period of time, be more sediment available than on an average year since there will be soil disturbance from the project. The amount of sediment that can move through, however, remains limited due to the size of the outlet structure. The maximum amount of soil that could move through is dependant, as well, on the flows available to move it. If the flows were large enough to do so, the full amount of sediment that can move through the dam would do so, and additional sediment may make its way to the Rio Grande. If this were to occur, this would help to meet requirements of the 2003 Biological Opinion regarding operations by the Corps and the U.S. Bureau of Reclamation on the Rio Grande.

Therefore, soils will be initially disturbed by the Proposed Action alternative. Due to the fact that soils will be graded and revegetated, the project would not significantly affect soils of the area. Use of goats to treat resprouts would also have some soil disturbance though the indentations caused by their hooves have been shown to encourage vegetation growth which would also help stabilize the soil.

3.2 Climate

The semiarid continental climate of the Galisteo Creek watershed results in cool, pleasant summers and clear, crisp winters. During midsummer the days are warm and the nights cool. Because of predominately clear weather, there is considerable daytime warming during the winter, although the nights are usually cold and the temperature often falls below freezing. Cold weather periods are usually brief and are accompanied by brilliant sunshine and low humidity.

Information on temperature from the nearest weather station at Cochiti Lake show an average temperature of 20-30 °F at night and 30-50 °F during the day in the winter, and 30-60 °F at night during the summer and 60-100 °F during the daytime summer hours.

Average annual precipitation from 1961-1990 for the area shows an average of 10-14 inches per year (USDA NRCS, 1998). There can be great variation in precipitation due to thunderstorm activity generally occurring during the summer months. Snowfall in the area also varies between the northern and southern boundaries of the watershed due to differences in elevation. The average annual humidity is approximately 43 percent.

3.3 Hydrology and Water Quantity

Galisteo Creek is an ephemeral stream. Most of the stream flow is produced by runoff resulting from thunderstorm activity and is characterized by high peaks and relatively small volumes. Thunderstorm activity, most prevalent during July and August, produces about 70 percent of the annual runoff. Runoff from snowmelt is not significant because the period of April through June produces less than 10 percent of the annual runoff (USACE, 2001).

Galisteo Creek flows in a canyon from its headwaters to the town of Cañoncito and then flows through the foothills of the Sangre de Cristo Mountains. There are major arroyos that merge into Galisteo Creek due to a tributary pattern caused by steep slopes. These include the San Cristobal Arroyo, Arroyo de los Angeles, Arroyo de la Jara, Arroyo Choro (Jansens and Kretzman, 2002). Other tributaries to the Galisteo Creek include Cañada Estacada, Gavisco Arroyo, Cunningham Creek, and Arroyo Charro (Daniel B. Stephens & Associates, 2003) as well as other un-named drainages.

Based on foundation piezometers placed both upstream and downstream of the Dam, water surface elevations have generally decreased over the past five years (1998-2003 data, of which 3 years included declared drought periods). A histogram of data grouped from 1970-1998 also shows a general decrease in annual flow below Galisteo Dam (S.S. Papadopoulos & Associates Inc., 2002).

Salt cedar and water quantity

In the Jemez y Sangre Regional Water Plan (which includes the Galisteo Watershed), produced for the Jemez y Sangre Water Planning Council, restoration of the forests and riparian areas is recommended to improve overall ecosystem health (Daniel B. Stephens & Associates, 2003). One of the main issues in the management of riparian zones is the control of exotic species. Recent studies indicate that exotic species such as salt cedar use similar amounts of water per unit leaf area as native woody riparian species. But if salt cedar has more leaf area on a stand basis than the native riparian species, or if it can occupy areas that are too dry or too saline for native woody riparian species, the shift from native riparian to salt cedar could result in a decrease in water yields (Daniel B. Stephens & Associates, 2002).

Potential water savings by removing salt cedar is being studied throughout the southwest (Cleverly et al., 2002; Dahm et al., 2002 ; Goodrich et al., 1998; Stromberg, 1998; Hanson, 1991). For example, a dense stand of salt cedar in the Middle Rio Grande was shown to have an evapotranspiration (ET) rate of approximately 3.34 mm/day (Dahm et al., 2002), whereas ET rates for a grass-covered area averaged 2.23 mm/day (Thorn, 1995). Estimated water savings from removing salt cedar on the Upper Pecos River in Texas range from 5,000-13,500 acre/feet/year (Hays et al., 2000).

Since salt cedar is a phreatophyte, it is known to be one of the greatest users of water (Hanson, 1991). Salt cedar, in particular, is an aggressive phreatophyte. It also has the capability to produce seed and germinate 10 months out of the year. Due to its aggressive nature and the potential for it to use greater amounts of water than its native counterpart, even in an area where water is sparse, it can survive on its stores of water in its deep root system. That makes it extremely difficult for native vegetation to compete against on its own. Given the chance, by opening up areas through removal and/or planting native vegetation, riparian species indigenous to the southwest, can prevail. Therefore, there is a potential for increasing water quantity under the Proposed Action alternative. The piezometers that exist upstream and downstream of the Dam will continue to be monitored and will be analyzed for these potential benefits.

3.4 Water Quality

There is little information on water quality for the Galisteo Watershed. Through the efforts of the Earth Works Institute, students of all ages are involved in monitoring areas of the Creek and may begin to generate this information. The New Mexico Environment Department, Surface Water Quality Bureau (SWQB), does have some initial water quality information from a sampling period in 2001. During this sampling period, readings of pH, temperature, dissolved oxygen (both in mg/L and percent saturation), electro conductance (EC), and turbidity were taken. Readings were taken on the surface water of the Creek near Highway 14 in Cerrillos and in Galisteo. According to SWQB staff, readings were fairly normal comparatively except for a slight exceedance in some temperature and conductance readings (Schaeffer, personal communication). There is no water quality data for the Creek at the Dam. Since it is an ephemeral Creek it is not monitored regularly.

There would not be a large quantity of sediment that would move through the Dam after mechanical extraction of salt cedar. There may, however, be more sediment available than on an average year since there will be soil disturbance from the project. The Dam has always been open to allow sediment to move through the Dam. Only a minimal amount of increased sediment would be released. Therefore, local water quality should not change.

Ash would be generated from the piles of debris that would be burned. By burning the debris in the piles away from the creek bed or in a hole as proposed in Section 2.1, a majority of the ash should remain on site. By employing this methodology as well as using a silt fence adjacent to the Creek (as discussed below), ash should not be transported into the Creek bed.

The Clean Water Act (CWA) provides for the protection of waters and wetlands of the United States from impacts associated with discharges of dredged or fill material in aquatic habitats, including wetlands, as defined under Section 404(b)(1). All work associated with the project would be accomplished outside of aquatic areas regulated by this law. The Corps Environmental Resources Section has coordinated with Corps Regulatory Division regarding this project and it was determined that the project is not regulated under the provisions of Section 404 of the Clean Water Act and a Department of the Army permit would not be required.

Section 402(p) of the Clean Water Act regulates point source discharges of pollutants into water of the United States and specifies that storm water discharges associated with construction activity be conducted under National Pollutant Discharge Elimination System (NPDES) guidance. Since ground disturbance will take place, an NPDES permit would be required. A Notice of Intent would be filed, and a Storm Water Pollution Prevention Plan (SWPPP) for the project would be developed by the contractor and be kept on file at the construction site and become part of the permanent project record. The Corps' contractor would obtain the NPDES permit prior to commencement of construction activities. Standard Best Management Practices (BMPs) would be included in the Corps contract specifications to minimize erosion problems during construction.

Compliance with these requirements would ensure that the Proposed Action would have no significant effect on the water quality of the Rio Grande. Silt fence would be installed along the Creek bank prior to construction in all areas. No adverse impact to water quality is anticipated.

3.5 Air Quality and Noise

The Galisteo Dam and Reservoir is located in the New Mexico intrastate Region 2 (EPA Region 152) for air quality monitoring. Santa Fe County is designated as an air quality attainment area for criteria pollutants (particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and lead) as determined by National Ambient Air Quality Standards. Almost all of Santa Fe County is considered as Class II under the Prevention of Significant Deterioration (PSD) Program. PSD Class II areas allow moderate human development and its resulting air quality impacts. The closest PSD Class I (pristine) areas in the County or elsewhere are the Bandelier Wilderness and the Pecos Wilderness, respectively about 18 miles northwest and 32 miles northeast of the project area (NMED 1997). Air quality in the project area is generally good because of its rural setting. Although seasonal high winds are common, blowing dust is generally not a problem in the project area.

Air quality would be impacted within the project area on a temporary and limited basis during construction only. An air permit for Santa Fe County would be obtained from the New Mexico Environment Department, Air Quality Bureau would be obtained by the Corps' contractor. BMPs such as watering down of the work area to abate dust would be employed.

Piles of extracted material would be piled and burned, either directly on site or by digging a hole and burning the material inside the hole using an air curtain burner. All required permits would be acquired and regulations would be followed for open burning of this type. This would create some affects on air quality, though if the air curtain burner were utilized, these would be minimized.

Equipment to be used during construction would include pieces generating a fair amount of noise. This noise would be somewhat abated since work will take place within the basin of the Dam structure. The project would take place during normal work hours between 7:00am and 5:00pm in order to minimize disturbance. All OSHA and local municipality requirements (as described above) would be adhered to.

Ambient noise levels are typically very low in and around the proposed project area. The primary ambient noise source is from trains. A temporary increase in noise levels from the operation of machinery and related vehicles during construction is expected.

There would be minor, short-term noise and air quality impacts by the Proposed Action during construction, which would occur only during normal working hours. Therefore, the Proposed Action alternative would have no significant affect on air quality and noise.

3.6 Aesthetics

The current view from the picnic area of Galisteo Dam affords a majestic overview of the watershed looking east. The view directly upstream is currently of a red sea of salt cedar. Post

project, the area immediately upstream of the Dam would be denuded of salt cedar, but areas of native wet meadow and grass would remain. During construction, machinery would be able to be viewed from the viewing area. Since this would be during construction only, aesthetics would not be significantly affected by the Proposed Action alternative.

3.7 Vegetation Communities

Areas to be cleared consisted of nearly monotypic salt cedar. Vegetation observed throughout the Dam area during field visits conducted by Corps of Engineers personnel includes: stream bank groundsel (*Senecio pseud aureus*), Feather dalea (*Dalea* sp.), wavyleaf thistle (*Cirsium undulatum*), spineless horsebrush (*Tetradymia canescens*), common cocklebur (*Xanthium strumarium*), smallseed flax (*Camelina microcarpa*), blue mustard (*Chorispora tenella*), Plains pricklypear (*Opuntia polyacantha*), kochia (*Kochia scoparia*), Russian thistle (*Salsola iberica*), Russian-Olive (*Elaeagnus angustifolia*), twogrooved milkvetch (*Astragalus bisulcatus*), silverleaf nightshade (*Solanum elaeagnifolium*), saltcedar (*Tamarix ramosissima*), common cattail (*Typha latifolia*), puncturevine (*Tribulus terrestris* L.), Siberian elm (*Ulmus pumila*), bladder campion (*Silene vulgaris*), Canada goldenrod (*Solidago canadensis*), willow (*Salix* spp.), and gray rabbitbrush (*Chrysothamnus nauseosus*).

Historical vegetation accounts of the area describe similar vegetation as well as sightings of cactus in sandy areas. In 1846, an area on the “Rio Galisteo a few miles above Santo Domingo” was described as “clothed with cedars but destitute of grass or other vegetation” (Leopold, 1951).

Salt cedar was shown to occupy approximately 62 acres upstream of the Dam in 1973 (Ecological Information Service, 1973) when an environmental study was performed shortly after the Dam was installed in 1970. At this time, it was determined that the salt cedar began to accumulate upstream of the Dam from seed sources upstream, and was approximately 3-4 years old. With the pool area being expanded in 1995, the sediment area upstream of the Dam was widened (USACE, 1994) allowing more area for new salt cedar to establish. It has continued to increase in population with approximately 212 acres of monotypic salt cedar occurring upstream of the Dam.

Within the salt cedar stands, some grass species exist under the dense overstory. With extraction of salt cedar, more openings to sunlight would be provided. Grasses that were in the area may then rebound rather quickly and fill in the gaps. Therefore, there would be an initial impact to vegetative communities, but the main target is the salt cedar. Native grasses and shrubs in the area should resprout in the next growing season.

The removal of exotic species and the restoration of riparian zones are generally regarded as being environmentally beneficial. Whereas salt cedar stands provide little habitat for native fauna and are often dense, flammable monocultures, healthy stands of native riparian vegetation provide critical habitat for threatened or endangered species. A healthy riparian ecosystem is critical to the health of the adjacent stream in terms of temperature regulation, bank stability and sediment inputs, the input of organic matter and large wood, and the filtering of sediment and nutrients from overland flow (Daniel B. Stephens & Associates, 2002).

Once non-native vegetation is extracted, the area will be seeded and revegetated with species native to the area. As stated above, some regrowth may also be stimulated by using goats to treat resprouts. The soil is stimulated by the traffic of their hooves. Replacing dead material and non-native vegetation with a mosaic of native vegetation including native grasses and shrubs should lead to a system of less water use, decreased fire danger, and increased diversity of native species for use by wildlife. Therefore, the long-term affects of replacing the non-native dominated vegetation system with native dominated species is proposed to outweigh the short-term negative effects, which would be caused by the Proposed Action.

3.8 Floodplains and Wetlands

Executive Order 11988 (Floodplain Management) provides Federal guidance for activities within the floodplains of inland and coastal waters. Preservation of the natural values of floodplains is of critical importance to the nation and the State of New Mexico. Federal agencies are required to “ensure that its planning programs and budget requests reflect consideration of flood hazards and floodplain management.” Removal of non-native vegetation may allow the floodplain to expand. This would allow watering of the treated area and potential growth of vegetation from native seed in the area. Therefore, the Proposed Action may affect the floodplain, but these impacts are anticipated to be positive.

Executive Order 11990 (Protection of Wetlands) requires the avoidance, to the extent possible, of long- and short-term adverse impacts associated with the destruction, modification, or other disturbances of wetland habitats. Treatment of the project area was identified in order to avoid adjacent wetland communities. An area of approximately 3-5 acres of wetland habitat exists to the east of the project area. Vegetation in this area includes wet meadow species such as Coyote willow (*Salix exigua*) and various sedges and grasses. This area will be avoided and hopefully expand once the salt cedar is removed. Therefore, the Proposed Action would not impact wetland communities in the Galisteo Dam project area.

3.9 Wildlife

During May-July, 2003, the following bird species were observed and/or heard by Corps of Engineers personnel: Cedar Waxwing (*Bombycilla cedrorum*), Rock Wren (*Salpinctes obsoletus*), Say’s Phoebe (*Sayornis saya*), Ash-throated flycatcher (*Myiarchus cinerascens*), Blue Grosbeak (*Guiraca caerulea*), Scaled Quail (*Callipepla squamata*), Yellow-Breasted Chat (*Icteria virens*), Spotted Towhee (*Pipilo maculatus*), Common Yellowthroat (*Geothlypis trichas*), Brown-Headed Cowbird (*Molothrus ater*), Mourning Dove (*Zenaida macroura*), House Finch (*Carpodacus mexicanus*), and Common Raven (*Corvus corax*). Primary breeding bird species include Rock Wren, Say’s Phoebe, Ash-throated flycatcher, Blue Grosbeak, Spotted Towhee, Brown-Headed Cowbird, Mourning Dove, and House Finch. Other bird species likely to occur in the vicinity of the project include: Swainson’s Hawk (*Buteo swainsoni*), Prairie Falcon (*Falco mexicanus*), Burrowing Owl (*Athene cunicularia*), Greater Roadrunner (*Geococcyx californianus*), Scrub Jay (*Aphelocoma coerulescens*), and Vesper Sparrow (*Pooecetes gramineus*) (NMDGF 2003, Peterson 1990, Hubbard 1978).

Amphibians and reptiles likely to occur in the vicinity of the project include: Tiger salamander (*Ambystoma tigrinum*), Mole salamander (*Ambystoma tigrinum*), Plains spadefoot (*Spea*

bombifrons), New Mexico spadefoot (*Spea multiplicata*), Great Plains toad (*Bufo cognatus*), Woodhouse's toad (*Bufo woodhousii*), Canyon treefrog (*Hyla arenicolor*), Collared lizard (*Crotaphytus collaris*), Lesser earless lizard (*Holbrookia maculata*), Short-horned lizard (*Phrynosoma douglasii*), Roundtail horned lizard (*Phrynosoma modestum*), Prairie lizard (*Sceloporus undulatus*), Chihuahuan spotted whiptail (*Cnemidophorus exsanguis*), Little striped whiptail (*Cnemidophorus inornatus*), Plateau striped whiptail (*Cnemidophorus velox*), Great Plains skink (*Eumeces obsoletus*), Glossy snake (*Arizona elegans*), Corn snake (*Elaphe guttata*), Western hognose snake (*Heterodon nasicus*), Night snake (*Hypsiglena torquata*), Coachwhip (*Masticophis flagellum*), Striped whipsnake (*Masticophis taeniatus*), Bullsake (*Pituophis melanoleucus*), Mountain patchnose snake (*Salvadora grahamiae*), Blackneck garter snake (*Thamnophis cyrtopsis*), Western terrestrial garter snake (*Thamnophis elegans*), Western diamondback rattlesnake (*Crotalus atrox*), and Western rattlesnake (*Crotalus viridis*) (Degenhardt et al., 1996).

Mammals likely to occur in or near the project area include Fringed myotis (*Myotis thysanodes*), Desert cottontail rabbit (*Silvilagus audubonii*), Black-tailed jack rabbit (*Lepus californicus*), Colorado chipmunk (*Tamias quadrivittatus*), Rock squirrel (*Spermophilus variegates*), Botta's pocket gopher (*Thomomys bottae*), Silky pocket mouse (*Perognathus flavus*), Plains pocket mouse (*Perognathus flavescens*), Ord's kangaroo rat (*Dipodomys ordii*), Western harvest mouse (*Reithrodontomys megalotis*), Piñon mouse (*Peromyscus truei truei*), Southern plains wood rat (*Neotoma albigula*), porcupine (*Procyon lotor*), coyote (*Canis latrans*), Gray fox (*Urocyon cinereoargenteus scottii*), raccoon (*Procyon lotor*), Long-tailed weasel (*Mustela frenata*), badger (*Taxidea taxus berlandieri*), bobcat (*Lynx rufus baileyi*) and Western spotted skunk (*Spilogale gracilis*) (NMDGF, 2003).

Wildlife would clearly be disturbed during operation of the extraction equipment. Animals would be displaced from inside of the salt cedar stand, and would most likely relocate to adjacent vegetated areas that would not be affected. Since the area would be treated over two seasons, this would allow animals to use the areas not being worked in during the opposite season.

The disturbance would force some avian species, which use salt cedar vegetation, into adjacent habitats. This disturbance would occur outside the breeding season thereby avoiding impacts to nesting species. The Migratory Bird Treaty Act protects migratory bird species and requires activities to take place outside of general bird nesting season, which is March through August. Again, the disturbance will occur outside of this time frame.

Small mammal population monitoring in restored riparian areas where disturbance also occurred indicates that these populations quickly recolonize disturbed areas, responding to early herbaceous plant community establishment resulting from local precipitation events (Taylor, 1999). Early successional vegetation germinating after local precipitation events would favor a larger ground-feeding guild of birds in the disturbed area. Animals that have migrated to other areas adjacent to the salt cedar would also return once vegetation begins growing again.

Therefore, the long-term benefits to wildlife would outweigh the initial impacts of the project. The short-term effects of the Proposed Action will cause significant changes in vegetative habitat

for wildlife; however, natural and planned revegetation of the area will provide future habitat and mitigate for the effects in the long-term.

3.10 Endangered and Protected Species

Three agencies who have primary responsibility for the conservation of animal and plant species in New Mexico are the U.S. Fish and Wildlife Service (USFWS), under authority of the Endangered Species Act of 1973 (as amended); the New Mexico Department of Game and Fish (NMDGF), under the authority of the Wildlife Conservation Act of 1974; and the New Mexico Energy, Minerals and Natural Resources Department, under the authority of the New Mexico Endangered Plant Species Act and Rul NO NMFRCD 91-1. Each agency maintains a list of animal and/or plant species that have been classified or are candidates for classification as endangered or threatened based on present status and potential threat to future survival and recruitment. Of those species, those with potential to occur in or near the project are given in Table 2.

Table 2: Federal and State of New Mexico species of concern that may occur in the project area.

Species	Federal Status	State Status
Southwestern Willow Flycatcher (<i>Empidonax traillii extimus</i>)	E	E
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	T	T
Western Yellow-Billed Cuckoo (<i>Coccyzus americanus occidentalis</i>)	C	-
New Mexican meadow jumping mouse (<i>Zapus hudsonius luteus</i>)	SC	-
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	SC	-
American peregrine falcon (<i>Falco peregrinus anatum</i>)	SC	-
Arctic peregrine falcon (<i>Falco peregrinus tundrius</i>)	SC	-
Baird's sparrow (<i>Ammodramus bairdii</i>)	SC	T
Northern goshawk (<i>Accipiter gentilis</i>)	SC	-
Western burrowing owl (<i>Athene cunicularia hypugea</i>)	SC	-
Santa Fe cholla (<i>Opuntia viridiflora</i>)	SC	-

E – Endangered, T- Threatened, PT – Proposed Threatened, C – Candidate, SC- Species of Concern

Rare plants listed for Santa Fe County, New Mexico include: Tufted sand verbena (*Abronia bigelovii*), Cyanic milkvetch (*Astragalus cyaneus*), Santa Fe milkvetch (*Astragalus feensis*), Flint Mountains milkvetch (*Astragalus siliceous*), Santa Fe dodder (*Cuscuta fasciculate*), Sapello Canyon larkspur (*Delphinium sapellonis*), New Mexico stickseed (*Hackelia hirsutai*), Springer's blazing star (*Mentzelia springeri*), Santa Fe cholla (*Opuntia viridiflora*), Santa Fe raspberry (*Rubus aliceae*), and Weatherby's spike moss (*Selaginella weatherbiana*).

This EA is intended to meet the requirements of Section 7 of the Endangered Species Act. A determination of affect to Federally listed species is included in the discussion for each species below.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*) – The Southwestern Willow Flycatcher (SWFL) is a Federally and State listed species, which typically inhabits dense thickets of coyote willow (*Salix exigua*) or salt cedar near slow-moving water. Within the project area to be treated, habitat is only marginally suitable as willow flycatcher (WIFL) breeding habitat.. Within the 212-acre stand of salt cedar along the side drainage, suitable structure was lacking in height and density and the area did not have slow-moving water, water at all or saturated soil. The salt cedar and Russian Olive stands bordering Galisteo Creek is somewhat taller and denser, but still only marginally suitable breeding habitat; especially considering the ephemeral nature of river flows.

In order to be certain that the species was not at the project site, Corps of Engineers biologists performed protocol surveys on May 29, June 13, June 29, July 4 and July 9, 2003. Surveys were conducted from the Creek bed as well as in salt cedar stands that were potentially the preferred height and density to attract WIFLs. No WIFLs were detected.

WIFL uses a variety of habitat types in migration, including those similar to that being cleared. Since no WIFLs were detected during surveys and the habitat available is minimally suitable, the Proposed Action will have no effect on the Southwestern Willow Flycatcher.

Bald Eagle

The Bald Eagle may potentially occur in the project area though none were seen during visits to the site by Corps staff. They have been shown to rarely occur in Santa Fe County during the fall/winter (NMDGF, 2003). No individuals are known to roost or nest in the area. Approximately five cottonwood trees were observed by Corps staff during site visits. Most of these are on the downstream side of the Dam in the area that would need to be treated by hand. All cottonwood and other native vegetation would be left untouched. Since there are no regular flows in the Creek, there is no fish population and therefore, Bald Eagles would most likely not be present.

For these reasons, the Proposed Action will have no effect on the Bald Eagle.

Western Yellow-Billed Cuckoo

The Western Yellow-Billed Cuckoo is a candidate species for federal protection under the ESA. It has been shown to historically occur in New Mexico and locally common in a few river reaches in the state (USFWS, 2002). It has been identified on sites along the Rio Grande in Albuquerque during censuses performed by the U.S. Forest Service Rocky Mountain Research Station (MRGCD, 2002). It was not identified as being in the project area during visits by Corps staff. Therefore, it has been determined that the Western Yellow-Billed Cuckoo will not be affected by the Proposed Action alternative.

In a Biological Opinion addressing water operation in the middle Rio Grande, the U.S. Fish and Wildlife Service (2003) included in their Reasonable and Prudent Alternatives an element instructing the Corps to increase sediment transport through Jemez Canyon, Cochiti, and Galisteo dams. As previously mentioned, the proposed action would not appreciably affect sediment movement from the project area. Studies conducted by the Corps in association with

the proposed action indicate that sediment from the upstream basin cannot be feasibly increased due to the lack of control in the ungated galley of the dam and the intermittency of Galisteo Creek discharge.

None of the state listed Species of Concern or rare plants are known to occur at the site and therefore, will not be affected.

3.11 Cultural Resources

Cultural resources investigations conducted by the Corps at Galisteo Reservoir include Dutton (1964), Kayser and Ewing (1971), Lang (1976, 1977a, 1986), Phillips and Seymour (1982), Batten and Dello-Russo (1993), Kneebone (1994), Brown (1997), and Doleman and Brown (2000). These investigations included archaeological inventory surveys, salvage archaeology, site revisitation and reevaluation, and some limited testing. The inventory surveys have covered 100 percent of the Galisteo Reservoir Project's fee land and most recently have also covered the flood easement land.

Culture history for Galisteo Reservoir and generally for the middle Rio Grande area has been documented in numerous references such as Cordell (1979, 1984, 1997), Ortiz (1979), and Stuart and Gauthier (1984). The Northern Rio Grande Region has been archaeologically defined by Wendorf and Reed (1955). Other archaeological investigations conducted in the local area included those such as Nelson (1914), Dutton (1966, 1980), Lang (1968, 1977b, 1986), Honea (1971), and more recently by Stein and Loose (1980), Gauthier et al. (1982), Acklen (1984), Geister (1989), Lycett (1995), Mednick (1996), Doleman (1996), Stewart (1997, 1998), Condie (2000), and the significant investigations conducted at nearby Cochiti Lake by the University of New Mexico's Office of Contract Archeology (Biella 1979, Biella and Chapman 1977, 1979; and Chapman and Biella 1977). A history of the Corps' Albuquerque District has been prepared by Michael Welsh (1985).

A search of Corps' records and of the New Mexico Historic Preservation Division, Archeological Records Management Section's database found that numerous archaeological sites occur in the vicinity; however, no sites are located in the proposed vegetation removal area. Searches of the State Register of Cultural Properties and National Register of Historic Places found that there are no known historic properties reported to occur within or immediately adjacent to the project area. No traditional cultural properties are known to occur in the immediate vicinity of the proposed project area.

Galisteo Dam and Reservoir is located on lands that once comprised the 1782 Mesita de Juana López Land Grant (GAO 2001:14). This community land grant was confirmed by Congress on January 28, 1879 (GAO 2001:25; Kayser and Ewing 1971:6).

The closest archaeological sites to the tamarisk removal area include New Mexico Laboratory of Anthropology [LA] site numbers LA37994, LA37996, LA37997, LA37998, LA37999, LA38000, and LA38003 located on the north side of the reservoir and LA356, LA9143 (112403), LA37977, LA37979, LA37980, LA37981, LA37982, LA37983, LA37984, LA37985, LA37986, LA37987, LA37988, LA37989, LA37990, and LA37991, located on the south side of

the reservoir (See Figure 2a; Public Disclosure of Archaeological Site Locations is Prohibited by 16 U.S.C. 470hh). These sites are located in upland areas above the sediment pool/riparian floodplain and would not be affected by the proposed project. The archaeological sites, LA6869 (the Wheeler Site) and LA9142 (the Signal Site), were originally located near the project area; however, these sites were destroyed by construction of the dam after salvage archaeology excavations were conducted between December 1964 and April 1965 (Phillips and Seymour 1982:11, 1-44; Kayser and Ewing 1971:2).

Although no segments of the trail remain in the immediate vicinity of the proposed project area, due to the significant earthmoving activities during original dam construction in the late 1960s, segments of El Camino Real de Tierra Adentro, a National Historic Trail, traverse the Galisteo Reservoir area (NPS-BLM 2002; Doleman and Brown 2000; Marshall 1991). In the Galisteo Reservoir area, components of the trail and associated sites include trail segments of the Los Alamitos Road (LA80010), the Los Alamitos Encampment (LA80002), the Galisteo Bridge (LA80003), and trail segments that comprise the Galisteo North Road (LA80011) (NPS-BLM 2002:184, 209-212; Doleman and Brown 2000:47-50, 54-55; Marshall 1991:89-114). From the southwest, the trail reaches the south side of Galisteo Creek and in one place downstream of the dam structure a trail segment crosses the creek; another route alignment remains on the south side of the creek and proceeds in an easterly direction along the south bank. These trail alignments travel to the east, proceed under the dam structure and pool sediment deposits, re-emerging approximately one mile east of Galisteo Dam where the trail climbs out of the creek's floodplain. The trail then leaves the Galisteo Reservoir area proceeding to the northeast toward Santa Fe and the Pueblo of San Juan (NPS-BLM 2002:184, 209-212; Doleman and Brown 2000:47-50, 54-55; Marshall 1991:89-114).

The Camino Real trail segments and associated sites would not be directly affected by the proposed tamarisk removal project. However, the removal of tamarisk may potentially increase the likelihood of streambank erosion downstream of the dam structure, and therefore may affect four archaeological sites that are located along Galisteo Creek. The sites include LA80002, the Los Alamitos Encampment; LA80003, the Galisteo Bridge; LA80010, Los Alamitos Road; and LA125532, a multi-component site that is comprised of Pueblo IV and historic period artifacts. To mitigate for potential future impacts to these four sites from streambank erosion, the Corps is planning for an investigation to include archival research and limited archaeological testing.

A similar situation occurs with the abandoned segment of old Atchison, Topeka and Santa Fe Railroad grade/alignment, designated as LA37994. The existing, old alignment is the same as or closely follows the alignment of the railroad as laid out in 1880. Remnants of the old railroad grade remain visible in aerial photography and are visible on the ground surface downstream of the dam and in upstream portions of the reservoir near the historic community of Waldo (Figure 3). The railroad segment in the Galisteo Dam and Reservoir area was abandoned in 1966, immediately prior to dam construction, the steel rails and cross-ties were removed, and the railroad was relocated to a higher elevation north of the reservoir (Figures 2 and 3). During dam construction, the railroad bed/grade in the immediate vicinity of the dam was removed, and a portion of the grade immediately upstream of the dam is now covered by sediment deposition. While the alignment and a few of the railroads structures located upstream of the dam are now

over fifty years old, the railroad grade/bed essentially remains as a modern structure due to the railroad's years of significant operations and maintenance efforts that continued until the segment was abandoned. LA37994 would not be affected by the proposed tamarisk removal project in the upstream reservoir area. Downstream of the dam, the railroad grade would most likely not be affected by potential streambank erosion since the north bank of Galisteo Creek was armored by the railroad in order to prevent streambank erosion. Historic trash associated with and located along the abandoned railroad grade has been documented.

No archaeological sites or historic properties occur within the proposed 86 hectare (212 acre) project area and archaeological sites located upstream of the dam are in upland areas that would not be affected by the proposed project. No traditional cultural properties are known to occur in the immediate vicinity of the proposed project area. Four archaeological sites located downstream of the dam/project area may, during some future rainfall event(s), be impacted by streambank erosion; therefore the Corps will conduct an investigation to mitigate for that potential impact. The tamarisk removal project would utilize existing paved and gravel roads and previously disturbed areas within the Corps' Galisteo Reservoir fee land for staging. Based on the above information, the Corps is of the opinion that the Galisteo Reservoir Tamarisk Removal Project would have "No Adverse Effect to Historic Properties."

The New Mexico State Historic Preservation Officer (SHPO) has concurred with the Corps' determination of No Adverse Effect. Consultation with the SHPO will occur in the near future regarding an investigation plan that would include limited testing (archaeological excavation) for data recovery purposes for mitigating potential future impacts. Consultation with the SHPO, the National Park Service, and American Indian Tribes regarding cultural resources is documented in Appendix B.

3.12 Socioeconomic Considerations

Farming is important in the watershed at the few locations where surface water is consistently available for irrigation, such as Santa Domingo Pueblo. Tourism and mining are important components of the economy in the Madrid area upstream of the Dam. Also, there is gypsum mining near Galisteo Dam and cattle ranching over most of the watershed.

Over 90 percent of the Galisteo Creek watershed lies in Santa Fe County. In 2000, there were 129,292 people in Santa Fe County (U.S. Census Bureau, 2000). The ethnic distribution within the County is 49.0 percent Hispanic, 45.5 percent Anglo, 3.1 percent Native American, and 2.4 percent other. The main sources of employment are state government, retail trade, accommodations and food service, health care and social services, and construction (New Mexico Department of Labor, 2001). For the year 2000, the per capita personal income was \$30,186 (New Mexico Economic Development Department, 2003).

The target area of the planned action is specifically upstream and downstream of the Dam within Corps property. The Proposed Action alternative would not adversely affect the social or economic well being of the region.

3.13 Land Use and Recreational Resources

The predominant land use in the project area and in the Galisteo Creek watershed is cattle grazing. Up until November of 2002, the Corps leased grazing rights on Corps-administered property to ranchers using adjacent lands. Lands adjacent to the Dam are still grazed by private landowners. Other existing uses include an open-pit gypsum mine about 1.5 miles below the Dam, a gold mine south of the project area in the Ortiz Mountains, and limited picnicking, hiking and sightseeing centered on the Corps-administered picnic area. The Proposed Action alternative would not convert these lands to other uses and would help restore the area upstream of the Dam that was historically grazed.

There are few opportunities for formalized public recreation in the vicinity of Galisteo Dam. Much of the land is privately owned and there are few roads and trails. However, there is a road directly to the picnic area, which is on the south side of the Dam and offers the visitor an impressive vista of the Galisteo watershed and surrounding terrain. There would not be any physical impacts to this facility. The view would be slightly altered with vegetation removed dying off directly upstream and downstream of the Dam. Therefore, the Proposed Action alternative will not significantly affect land use and recreational resources.

3.14 Indian Trust Assets

Indian Trust Assets are legal interests in property held in trust by the United States for Indian tribes or individuals. Examples of trust assets include land, minerals, hunting and fishing rights, and water rights. The United States has an Indian Trust Responsibility to protect and maintain rights reserved by or granted to Indian tribes or individuals by treaties, statutes, executive orders, and rights further interpreted by the courts. This trust responsibility requires that all Federal agencies take all actions reasonably necessary to protect such trust assets. There would be no affect on Indian Trust Assets by the Proposed Action as all potential projects on Pueblo land are being coordinated with their input and approval.

3.15 Hazardous and Toxic Waste

The Cerrillos Hills and Ortiz Mountains are part of a historical mining district for various metals and minerals. Naturally occurring levels of metals in the area are expected to be elevated and most likely above established State of New Mexico standards. There is an active gypsum mine adjacent to Galisteo Creek and downstream from Galisteo Dam. No current industrial activities or mining for metal ore are known to exist near or adjacent to the project area. Levels of metals in the soils, sediments, and waters in and around this project area are expected to be at naturally occurring levels since human activity is limited to day visits and historical mining.

In October and November of 2004, several sediment samples from Galisteo Creek and the surrounding banks upstream and immediately downstream of Galisteo Dam (on Federal property) were collected by a Corps contractor. These and additional samples collected adjacent to Galisteo Creek were analyzed in order to establish a site-specific background level for metals in this area. All samples were analyzed for metals content since there is a known naturally elevated metal component in the area (due to past mining). A report entitled "Retained Sediment Characterization: Galisteo Reservoir, Santa Fe County, New Mexico" (AVM Environmental Services, Inc., 2005) was completed and is available upon request. The "Retained Sediment

Characterization Work Plan" that was used to determine what analysis to be performed is also available upon request. Evaluation of the metals analysis data indicates that the level of metals in the creek sediment is within naturally occurring site-specific background levels as expected, and therefore does not exceed standards.

Since Galisteo Creek is ephemeral in the dam area, there has been no water in the creek during site visits and no surface water samples have been collected. There are no known groundwater wells in the immediate area deep enough that can be sampled.

The Material Safety Data Sheets for the herbicide presented in the Proposed Action, Section 2.1 and Section 3.18 of this EA, has been reviewed and no lasting toxicological or detrimental ecological effects from the use of these products are known. The herbicide would be applied according to the manufacturer's instructions. When used in the manner intended and per manufacturers instructions the herbicide application area is not considered a contaminated or waste area. Excess herbicide will be disposed in accordance with all Federal, State, and Local regulations.

3.16 Environmental Justice

Executive Order 12898 (Environmental Justice) requires "to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report of the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations..." All work is in a rural area. The project would not disrupt or displace any residential or commercial structures.

Also included with environmental justice are concerns pursuant to EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO directs Federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children under the age of 18. These risks are defined as "risks to health or to safety that are attributable to products or substances that the child is likely to come into contact with or ingest." This work has been reviewed for compliance with these order and it has been determined that the Proposed Action alternative would not adversely affect the health or environment of minority or low-income populations.

3.17 Noxious Weeds

The Federal Noxious Weed Act of 1974 (Public Law 93-269; U.S.C. 2801) provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce. Executive Order 13112 directs Federal agencies to prevent the introduction of invasive (exotic) species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

In addition, the State of New Mexico, under administration of the United States Department of Agriculture, designates and lists certain weed species as being noxious (Nellessen 2000). "Noxious" in this context means plants not native to New Mexico that may have a negative

impact on the economy or environment, and are targeted for management or control. Class C listed weeds are common, widespread species that are fairly well established within the state. Management and suppression of Class C weeds is at the discretion of the lead agency. Class B weeds are considered common within certain regions of the state but are not widespread. Control objectives for Class B weeds are to prevent new infestations, and in areas where they are already abundant, to contain the infestation and prevent their further spread. Class A weeds have limited distributions within the state. Preventing new infestations and eliminating existing infestations is the priority for Class A weeds.

These guidelines apply to both the removal of salt cedar, which is considered a Class C weed as well as the potential for Class A, B, or C weeds which could establish themselves after the project is completed. Since the herbicide will destroy all vegetation in the area, other existing weed species (such as thistle which were detected during staff visits as mentioned in Section 3.8 above) will also be destroyed. It is anticipated that adjacent meadow vegetation will seed into the sprayed area once all of the vegetation has died. This should delay new infestation of weedy species. This will, however, be monitored and treated if necessary. Regrowth of all vegetation will be monitored over the 18-36 month waiting period for infestation by noxious weeds and non-native species such as salt cedar and Russian olive. This project will be beneficial for the removal of a Class C weed, salt cedar, and other noxious weeds.

3.18 Herbicide Application and the Environmental Fate of Chemicals

Herbicide may be used as a follow-up treatment to treat resprouts of non-native vegetation. Use of herbicide application was evaluated for each of the alternatives. Garlon 4 is the preferred herbicide to use as it works well year-round, affects only the non-native vegetation that it is sprayed upon, does not move rapidly in the soil, and is less expensive than other chemicals (such as Arsenal).

Garlon® is the commercial version of triclopyr and generally contains one or more inert ingredients. The contents of two triclopyr formulations are: Garlon® 3A: triclopyr (44.4%), and inert ingredients (55.6%) including water, emulsifiers, surfactants, and ethanol (1%); and Garlon® 4: triclopyr (61.6%), and inert ingredients (38.4%) including kerosene. Triclopyr acts by disturbing plant growth. It is absorbed by green bark, leaves and roots and moves throughout the plant. Triclopyr accumulates in the meristem (growth region) of the plant.

Basal bark and cut surface treatments can be done at any time of year. Triclopyr should be applied only when there is little or no hazard of spray drift. It should be applied immediately to the stump of the cut tree (within two hours). Triclopyr is active in the soil, and is absorbed by plant roots. Microorganisms degrade triclopyr rapidly; the average half-life in soil is 46 days. Triclopyr degrades more rapidly under warm, moist conditions. The potential for leaching depends on the soil type, acidity and rainfall conditions. This herbicide is selective to woody plants and has little to no effect on grasses (Parker et al., 2005). It has been certified and labeled to be used near water by the Environmental Protection Agency (EPA, 1998). After use, the public must remain away from the area for 48 hours. Signage would be placed at areas after they have been treated.

Triclopyr is slightly toxic to practically non-toxic to soil microorganisms. Practically nontoxic is defined as a probable lethal oral dose for humans at less than 15 g/kg (Klaassen et al., 1986). Triclopyr is toxic to many plants if applied directly. Even very small amounts of spray may injure some plants. That is why it is to be applied directly to the stump of the tree being treated. The ester form of triclopyr, found in Garlon® 4, is more toxic, but under normal conditions, it rapidly breaks down in water to a less toxic form. Triclopyr is slightly toxic to practically non-toxic to invertebrates. Slightly toxic is defined as a probable lethal oral dose for humans at 5-15 g/kg (Klaassen et al., 1986). Triclopyr and its formulations have not been tested for chronic effects in aquatic animals. Triclopyr is slightly toxic to mammals. In mammals, most triclopyr is excreted, unchanged, in the urine. Triclopyr and its formulations have very low toxicity to birds. Triclopyr is non-toxic to bees. Triclopyr and its formulations have not been tested for chronic effects in terrestrial animals. The exposure levels a person could receive from these sources, as a result of routine operations, are below levels shown to cause harmful effects in laboratory studies. Inert ingredients found in triclopyr products may include water, petroleum solvents, kerosene, surfactants, emulsifiers, and methanol. Methanol, kerosene and petroleum solvents may be a toxic hazard if the pesticide is swallowed. Surfactants and emulsifiers are generally low in toxicity. The formulated products are generally less toxic than triclopyr.

The U.S. Forest Service has evaluated health effects data in the development of both pesticide background statement documents and environmental impact statements for pesticide use on forest lands. These health effects evaluations have taken into consideration the potential for both worker and public exposure from Forest Service operations. This information has been used in assessing health risks and consequently in formulating protective measures to reduce risk to workers and to the public.

Garlon® 4 would be used for treatment of resprouts once they have grown at least 3 feet in height. Garlon® 4 has been shown to be more effective on smaller stems and resprouts (Doug Parker, personal communication).

As described in Section 2, herbicide may be used to treat resprouts once native vegetation is well established. Goats would be used at first to treat resprouts until native vegetation begins to take over. Once native vegetation is well established, goats would not be able to differentiate between species and may harm the native vegetation. Therefore, if treatment of resprouts is needed after that time, then Garlon would be applied as described above. If the native vegetation is successfully outcompeting the non-native resprouts, then herbicide will not be used and the area will be left to continue to rehabilitate on its own.

All required permitting and licensure would be obtained by the contractor. Prior to application, all chemicals will be specifically approved per manufacturers instructions. Follow-up inspections and monitoring post-herbicide application will be performed at all locations. If used properly, herbicide use will not have a significant effect on the environment.

3.19 Existing and Foreseeable Effects - No-Action Alternative

Left untreated, the area of salt cedar and other non-native species would continue to increase and crowd out the native vegetation at the site. Within the Galisteo Reservoir Project area, wet meadow habitat with native cattail, rush and willow exist to the east of the proposed action area. Periodic wetting from arroyo and Galisteo Creek flows support this habitat. However, salt cedar and Russian olives line the banks of the Creek and are beginning to encroach into these wet meadow areas. If the non-native vegetation were left untreated, it would continue to expand into these wet meadow areas and become established. Galisteo Creek would also continue to provide a seed source of salt cedar and Russian olive to downstream areas. The density of the stand would also continue to increase causing an increased fire hazard. Habitat value for wildlife species in the area would remain low. The large stand upstream would also continue to pose a threat to Reservoir operations by having the potential for tree debris to move into and block the outlet structure.

4.0 CONCLUSIONS

4.1 Cumulative Effects

NEPA defines cumulative effects as "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions." Any environmental impacts association with the Galisteo Dam and Reservoir would have been realized within the last 36 years since commencement of its construction in 1967 as well as the renovation work that was completed in 1995. These past impacts have stabilized and can be considered baselines against which impacts of the proposed project have been compared. The eradication of salt cedar upstream of the Dam would mitigate this effect that occurred as a result of construction of the Dam.

As mentioned in Section 3.8, the large stand of salt cedar that currently exists upstream of the Dam began to invade the area shortly after the Dam was constructed. The initiation of eradication of salt cedar and other non-native vegetation on the Galisteo Creek is an issue that is being considered by other land management agencies and communities that exist on the watershed. As discussed in Section 1.4, some agencies and groups have begun other efforts to eradicate these species on this waterway. It is hoped that the Corps and these groups can work together more closely to culminate projects and relationships that will allow a complete eradication of non-native vegetation on the Galisteo Creek. This will provide for a healthier watershed as well as reduce effects on the Rio Grande in terms eliminating a seed source.

In summary, it is proposed that this project would have a positive impact on the environment resulting from the potential cumulative effects of other Federal and non-federal agencies, pueblos and non-profit groups.

4.2 Project Benefits

The eradication of salt cedar upstream of the Galisteo Dam by the Albuquerque District of the Corps of Engineers would meet Operations Division goals to maintain the function of the Dam by removing this debris upstream of the Dam that clogs the trash rack. This project would also meet the goals of many agencies and groups in the state to eradicate non-native species on waterways throughout New Mexico. This has been a major push in the New Mexico State Legislature. Work is taking place on many waterways in the state that will aid in contributing to a reduction of the species as well as seed sources from tributaries to main river reaches. Other benefits include potential water savings, increased native wildlife habitat and reduction of wildfire potential.

This project will also aid in efforts to restore the Galisteo Creek watershed and potentially work with adjacent communities to foster a native riparian ecosystem. During the evaluation phase of the project, it is anticipated that much will be learned regarding this method of salt cedar eradication as well as how this particular geographic area responds to these attempts to repopulate the area with native vegetation.

It is anticipated that the short-term effects to the immediate environment will be outweighed by the long-term gain of salt cedar removal from the site and restoration of native habitat and wildlife to the area. Therefore the proposed project would have no significant impact on the human environment.

5.0 PREPARATION, CONSULTATION, AND COORDINATION

5.1 Preparers

Douglas Bailey – Project Manager
Cynthia Piirto – Outdoor Recreation Planner/Project Manager
Ondrea Hummel - Biologist
William DeRagon – Biologist/Quality Control
Julie Hall – Supervisory Ecologist/Quality Control
Gregory Everhart – Archaeologist
John Schelberg – Archaeologist/Quality Control
Cecilia Horner – Environmental Engineer

5.2 Consultation and Coordination

Agencies and other entities contacted formally or informally in preparation of this EA include:

U.S. Fish and Wildlife Service
New Mexico Department of Game and Fish
New Mexico Department of Agriculture, Bureau of Pesticide Management
New Mexico Environment Department
New Mexico State Historic Preservation Officer
County of Sandoval
Earth Works Institute
Natural Resources Conservation Service
Camino Real Trail Association
National Parks Service
Bureau of Land Management
Cochiti Pueblo
Comanche Indian Tribe
Hopi Tribe
Isleta Pueblo
Jicarilla Apache Nation
Kiowa Tribe
Navajo Nation
Nambe Pueblo
Pojoaque Pueblo
San Ildenfonso Pueblo
San Juan Pueblo
Santa Clara Pueblo
Santo Domingo Pueblo
San Felipe Pueblo
Tesuque Pueblo

5.3 Public Review

This Environmental Assessment was made available for public review from September 9 through October 11, 2005. A public meeting was held at the Turquoise Trail Elementary School in Santa Fe, New Mexico on September 22, 2005. Public comments and Corps responses are included in Appendix D.

Distribution List:

Ms. Susan MacMullin, U.S. Fish and Wildlife Service
Ms. Janell Ward, New Mexico Department of Game and Fish
Mr. Robert Sivinski, State of New Mexico, Energy, Minerals and Natural Resources
Department
Mr. John R. D'Antonio, Jr., State Engineer
Mr. Etevan Lopez, New Mexico Interstate Stream Commission
Maryann McGraw, New Mexico Environment Department
Mr. Brad Stableton, Sandoval County
Mr. Rob Lawrence, Environmental Protection Agency, Region 6
Mr. Tod Stevenson, ESA Collaborative Program
Mr. Charles Hibner, Natural Resource Conservation Service
Mr. Gedi Cibas, New Mexico Environment Department
Mr. Frank Dubois, Director/Secretary, New Mexico Department of Agriculture
Mr. Leonard Atencio, Forest Supervisor, U.S. Forest Service Santa Fe National Forest
Mr. Jan-Willem Jansens, Earth Works Institute
Honorable Joseph L. Trujillo, Governor Pueblo of Cochiti
Honorable Jimmie Cimarron, Governor Pueblo of San Felipe
Honorable Everett F. Chavez, Governor Pueblo of Santo Domingo
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Thomas and Judith Wimber
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Mr. Ken Weaver
Ms. Betty Lamphere
Ms. Judith Thatcher
Mr. Steve Harris, Rio Grande Restoration
Mr. Jim Crain
Mr. Ira Schildkraut
Lisa and Joy Moroz
Mr. Roger Peterson, New Mexico Natural History Institute
Susan Dayton/Miles Nelson
Jill Aikas St. Thomas
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Michael Roedel
Andrew Fenner
Steve Fitch
Sigmund Silber
Bob Chappell
Dennis Myers
Rick Green
Anne Lee
Louise Pope
Thor Siestedt
Thomas McKinley

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APPENDIX A
BIOLOGICAL COORDINATION

September 8, 2005

Planning, Project & Program Management Division
Environmental Resources Section

Ms. Susan MacMullin
U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113

Attention: Threatened and Endangered Species Section

Dear Ms. MacMullin:

In accordance with the Endangered Species Act, enclosed is a copy of the Draft Environmental Assessment entitled, **Galisteo Dam and Reservoir Salt Cedar Eradication Project, Galisteo Creek, Santa Fe County, New Mexico.**

The U.S. Army Corps of Engineers, Albuquerque District, is planning to eradicate salt cedar (*Tamarix ramosissima*) upstream of the Galisteo Dam (Dam) and Reservoir. Approximately 300 acres of salt cedar and other non-native vegetation upstream of the Dam would be removed. Mechanical extraction is the preferred method.

Information regarding endangered species is in Section 3.10. The Corps has made a final determination that the Proposed Action will not affect listed species.

A public meeting has been scheduled on September 22, 2005, from 6:00 p.m. to 8:00 p.m. at the Turquoise Trail Elementary School, 13A San Miguel Loop, Santa Fe, New Mexico. Information regarding the project will be provided and a question/answer session will follow.

The U.S. Army Corps of Engineers, Albuquerque District, requests that you respond within 30 days or less. Please submit your reply **no later than October 11, 2005**, so that we can address your comments, incorporate the correspondence into the final document, and complete National Environmental Policy Act compliance. If you have any questions or need additional information, please contact Ms. Ondrea Hummel, Biologist, at (505) 342-3375 or ondrea.c.hummel@usace.army.mil.

Sincerely,

Julie A. Hall
Chief, Environmental Resources Branch

Enclosure

APPENDIX B
CULTURAL RESOURCES COORDINATION



DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE NM 87109-3435

September 12, 2005

075524

Planning, Project and Program Management Division
Planning Branch
Environmental Resources Section



Ms. Katherine Slick
State Historic Preservation Officer
New Mexico Historic Preservation Division
228 East Palace Avenue, Room 320
Santa Fe, New Mexico 87501

Rec'd 10-7-2005
GDE

Dear Ms. Slick:

Pursuant to 36 CFR Part 800, the U. S. Army Corps of Engineers (Corps), Albuquerque District, is seeking your concurrence in our determination of "No Adverse Effect to Historic Properties" for the proposed Galisteo Reservoir Tamarisk Removal Project. The proposed project, being planned by the Corps' Operations Division, is a part of regular Operations and Maintenance of the Corps' Galisteo Dam and Reservoir Civil Works Project located along Galisteo Creek, Santa Fe County, New Mexico. Galisteo Reservoir is located about 32 kilometers (20 miles) southwest of Santa Fe.

The proposed project would eradicate approximately 300 acres of salt cedar (*Tamarix ramosissima*) and other non-native vegetation upstream of the Dam in the reservoir pool area and Galisteo Creek's riparian floodplain. Mechanical extraction is the preferred method. The vegetative debris would then be piled and burned on site.

Enclosed for your review is a cultural resources report entitled **Cultural Resources Documentation Regarding the Proposed Removal of 300 Acres of Tamarisk at Galisteo Dam and Reservoir, Santa Fe County, New Mexico**. The report includes a brief project description, documentation regarding the area's cultural resources, and area maps.

The 300-acre project area was highly disturbed by the original construction of the dam in the 1960s, and since construction, the area is now covered with approximately eight to ten feet of sediment. The project would utilize existing

paved and gravel roads and previously disturbed areas within the Corps' Galisteo Reservoir fee land for staging. Archaeological sites occur in upland areas near the reservoir; however, no cultural resources occur in the project area. No traditional cultural properties are known to occur in the vicinity of the proposed project. Copies of the cultural resources report have been forwarded to concerned tribes.

Four archaeological sites located downstream of the dam/project area may, during some future rainfall event(s), be impacted by streambank erosion; therefore the Corps plans to conduct an investigation to mitigate for that potential impact.

Based on information provided in the enclosed letter report, the Corps is of the opinion that the Galisteo Reservoir Tamarisk Removal Project would have "No Adverse Effect to Historic Properties."

If you have any questions or require additional information, please contact Mr. Gregory Everhart, Archaeologist, of my staff at (505) 342-3352 or Dr. John D. Schelberg, Archaeologist, at (505) 342-3359.

Sincerely,




Julie A. Hall
Chief, Environmental Resources
Section

Conditional No Adverse Effect

10/4/05
Date

I CONCUR


KATHERINE SLICK
NEW MEXICO STATE HISTORIC
PRESERVATION OFFICER

Provided that a testing/data recovery plan be prepared and submitted to this office prior to excavation. If data recovery is involved an MORA must be prepared and the ACHS must be invited to participate. Please call if you have questions.



Enclosures

Copy Furnished w/o enclosures:
Mr. Don Klima, Director
Advisory Council on Historic Preservation
Office of Planning and Review
12136 W. Bayaud Ave., #330
Lakewood, Colorado 80228-2115

Everhart, Gregory D SPA

From: Everhart, Gregory D SPA
Sent: Thursday, October 06, 2005 3:43 PM
To: Hummel, Ondrea C SPA
Cc: Schelberg, John D SPA; Kneebone, Ronald R SPA
Subject: proposed tamarisk removal at Galisteo

Ondrea,
I had a telephone conversation with Cochiti Pueblo Governor Joseph Trujillo this afternoon. The Pueblo of Cochiti has no cultural or environmental concerns regarding the proposed tamarisk removal project.
Thanks,
Gregory

Gregory D. Everhart
Archaeologist
Environmental Resources Section
U.S. Army Corps of Engineers, Albuquerque District
4101 Jefferson Plaza, NE
Albuquerque, New Mexico 87109
Phone: 505.342.3352
FAX: 505.342.3668
e-mail: gregory.d.everhart@usace.army.mil



Rec'd 10-12-2005
BDE

September 30, 2005

Julie Hall, Chief
Department of the Army
Albuquerque District, Corps of Engineers
Planning, Project and Program Management Division
Planning Branch
Environmental Resources Section
4101 Jefferson Plaza NE
Albuquerque, NM 87109-3435

Re: Planned operations and maintenance project at the Corps' Galisteo Dam and Reservoir Civil Works Project, located about 32 kilometers (20 miles) southwest of Santa Fe.

Dear Ms. Hall:

Thank you for your letter of September 12th regarding the planned eradication of approximately 300 acres of salt cedar and other non-native vegetation upstream of the Dam in the reservoir pool area and Galisteo Creek's riparian floodplain.

At this time, the Comanche Nation has no immediate concerns or issues regarding the project; however, please keep us informed of the project progress. We also would like to receive any archaeological reports and findings for the project area.

If in the process of the project human remains or archaeological items are discovered, we request that you immediately cease the project work and notify us so that we may discuss appropriate disposition with you and the other Tribal Nations that may be affected by such discoveries.

We look forward to your reports as activities proceed.

Sincerely,

Fred Nahwoosky, NAGPRA Coordinator

PO Box 908 • Lawton, Oklahoma 73502 • PHONE: (580) 492-3740 • FAX: (580) 492-3745



United States Department of the Interior

EL CAMINO REAL DE TIERRA ADENTRO NATIONAL HISTORIC TRAIL

BUREAU OF LAND MANAGEMENT
Division of Resources
P.O. Box 27115
Santa Fe, New Mexico 87502-0115
(505) 438-7454

NATIONAL PARK SERVICE
National Trails Office, IMR – Santa Fe
P.O. Box 728
Santa Fe, New Mexico 87504-0728
(505) 988-6742

October 7, 2005

Rec'd 10-14-2005
GDE

Mr. Gregory Everhart
Environmental Resources Section
Albuquerque District, Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, NM 87109-3435

Dear Mr. Everhart:

Thank you for the opportunity to review the cultural resources report entitled *Cultural Resources Documentation Regarding the Proposed Removal of 300 Acres of Tamarisk at Galisteo Dam and Reservoir, Santa Fe County, New Mexico*.

El Camino Real de Tierra Adentro National Historic Trail will not be directly impacted by the proposed surface disturbing activity. However, as was pointed out in the report, the removal of tamarisk may potentially increase the likelihood of streambank erosion downstream of the dam structure, and may impact archeological sites associated with the National Historic Trail. The planned mitigation for these indirect impacts further archival research and limited archaeological testing.


El Camino Real de Tierra Adentro National Historic Trail is co-administered by the National Park Service and the Bureau of Land Management. The trail administration is in concurrence with the recommendation of further archival research. In regards to limited archaeological testing, it is recommended that testing take place only in areas directly adjacent to stream bank erosion, where it is obvious that archaeological material will be lost over the next few years due to bank erosion. As an example, the slag area at the Alamos Site/Los Alamos Encampment (LA 80002) is in the process of being lost to erosion on the edge of Galisteo Creek.

It is also recommend that the historic bridge abutment (the Los Alamos Bridge, LA 80003) located within the area of indirect impacts be documented to HABS/HAER standards. This engineered feature is the only known bridge feature dating from the period of significance of the National Historic Trail.

Finally, we would urge you to pay particular attention to the location of staging areas, storage areas, and other temporary use areas associated with the tamarisk removal work. The terrace on which the Alamitos Encampment is located contains several excellent trail traces of the old Camino Real de Tierra Adentro (LA 80010, segments 1-7) both above and below the encampment itself. Although it may be tempting to drive on these terraces or to store heavy equipment there, or to stage activities from the terraces, as they are relatively level areas with good access to the tamarisk project area, this kind of activity would do irreparable damage to the trail segments and the other archaeological sites located here.

Please contact either Michael Taylor (NPS) at 505-988-6742 or Sarah Schlanger (BLM at 505-438-7454 if you would like to discuss any of the above cited recommendations.

Sincerely,


Michael Taylor
El Camino Real de Tierra Adentro
National Park Service


Sarah Schlanger
El Camino Real de Tierra Adentro
Bureau of Land Management



THE JICARILLA APACHE NATION

P.O. BOX 507 • DULCE, NEW MEXICO • 87528-0507

October 31, 2005

*Jicarilla Apache
Traditional
Culture
Committee*

*Wainwright Velarde
President*

*Howard Vigil
Vice President*

*Myra Sandoval
Secretary*

*Bryan F. Vigil
Treasurer*

*"dedicated to the
preservation
and
perpetuation
of the
Jicarilla Apache
culture
and
traditions"*

Julie A. Hall, Chief
Environmental Resources Section
Department of the Army
Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, NM 87109-3435

RE: Proposed Removal of 300 Acres of Tamarisk at Galisteo Dam
And Reservoir, Santa Fe County, New Mexico

Dear Ms. Hall,

As the designated representative of the Jicarilla Apache Nation to respond to all NHPA Section 106 tribal consultation requests, I have reviewed the information regarding the above referenced project.

The Jicarilla Apache has no known cultural or religious use concerns in the project area. However, we are requesting immediate notification in the event of an inadvertent discovery of human remains or associated funerary objects as in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA).

Please feel free to call me at 505-759-1343 if you have questions.

Sincerely,

Lorene Willis
Lorene Willis, Director
Jicarilla Apache Cultural Affairs

Cc: President Levi Pesata

*Rec'd 11-4-2005
GDE*



APPENDIX C
MATERIAL SAFETY DATA SHEETS (MSDS)

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Effective Date: 2/22/02
Product Code: 38322
MSDS: 004788

GARLON* 4 HERBICIDE

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Garlon* 4 Herbicide

COMPANY IDENTIFICATION:

Dow AgroSciences
9330 Zionsville Road
Indianapolis, IN 46268-1189

INGESTION: Low toxicity if swallowed. The oral LD₅₀ for rats is 1581 mg/kg (males) and 1338 mg/kg (females). Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.

2. COMPOSITION/INFORMATION ON INGREDIENTS:

Triclopyr ((3,5,6-trichloro-2-pyridinyl)oxy) acetic acid, butoxy ethyl ester	CAS# 064700-56-7	61.6%
Other ingredients, total, including:		38.4%
Kerosene	CAS# 008008-20-6	
Proprietary surfactants		

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

INHALATION: Excessive exposure may cause irritation to upper respiratory tract (nose and throat). Kerosene may cause central nervous system effects.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS:

Triclopyr BEE, in animals, effects have been reported on the following organs: blood, kidney, and liver.

CANCER INFORMATION: Triclopyr BEE did not cause cancer in laboratory animals. In a lifetime animal dermal carcinogenicity study, an increased incidence of skin tumors was observed when kerosene was applied at doses that also produced skin irritation. This response was similar to that produced in skin by other types of chronic chemical/physical irritation. No increase in tumors was observed when non-irritating dilutions of kerosene were applied at equivalent doses, indicating that kerosene is unlikely to cause skin cancer in the absence of long-term continued skin irritation. In long-term animal studies with ethylene glycol butyl ether, small but statistically significant increases in tumors were observed in mice but not rats. The effects are not believed to be relevant to humans. If the material is handled in accordance with proper industrial handling, exposures should not pose a carcinogenic risk to man.

3. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Hazardous Chemical. Amber liquid. Combustible. Kerosene-like odor. May cause eye and skin irritation. The LD₅₀ for skin absorption is >2000 mg/kg (rabbits) and >5000 mg/kg (rats). Oral LD₅₀ for rats is 1581 mg/kg (males) and 1338 mg/kg (females). Toxic to aquatic organisms.

EMERGENCY PHONE NUMBER: 800-992-5994

POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYE: May cause slight temporary eye irritation. Corneal injury is unlikely.

SKIN: Prolonged or repeated contact may cause skin irritation. Prolonged or frequently repeated skin contact may cause allergic skin reactions in some individuals. With the dilute mix, no allergic skin reaction is expected. Prolonged skin contact is unlikely to result in absorption of harmful amounts. Repeated skin contact may result in absorption of harmful amounts. The LD₅₀ for skin absorption is >2000 mg/kg (rabbits) and >5000 mg/kg (rats).

*Trademark of Dow AgroSciences

TERATOLOGY (BIRTH DEFECTS): For triclopyr BEE, birth defects are unlikely. Exposures having no effect on the mother should have no effect on the fetus. Did not cause birth defects in animals; other effects were seen in the fetus only at doses which caused toxic effects to the mother.

REPRODUCTIVE EFFECTS: Triclopyr BEE, in laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

MATERIAL SAFETY DATA SHEET



GARLON* 4 HERBICIDE

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Dow AgroSciences LLC
Indianapolis, IN 46268

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4. FIRST AID:

EYES: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several minutes. If affects occur, consult a physician, preferably an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN: The decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: 147°F (64°C)

METHOD USED: TCC

FLAMMABLE LIMITS

LFL: Not determined

UFL: Not determined

EXTINGUISHING MEDIA: Water fog, foam, CO₂, and dry chemical.

FIRE & EXPLOSION HAZARDS: Combustible. Toxic, irritating vapors may be produced if product is involved in fire.

FIRE-FIGHTING EQUIPMENT: Use positive pressure self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS/LEAKS: Keep out of streams and domestic water supplies. Absorb small spills in inert material such as sand. For large spills, dike the area and contact Dow AgroSciences at 800-992-5994.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep out of reach of children. Do not use near heat or open flame. Harmful if swallowed, inhaled, or absorbed through skin. Avoid contact with eyes, skin and clothing. Avoid breathing mists and vapors. Avoid contamination of food. Store above 28°F or agitate before use. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. For handling relative to end-use of this product, read the product label for further information concerning the use of personal protective equipment (PPE) under the Worker Protection Standard of 1993. Store in the original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where a potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINE(S):

3,5,6-Trichloro-2-pyridinyloxyacetic acid, Dowanol EB ester: Dow AgroSciences Industrial Hygiene Guide is 2 mg/M³ as acid equivalent, Skin.
Kerosene: Dow AgroSciences Industrial Hygiene Guide is 10 mg/M³.

A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material. It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

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RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guidelines. When respiratory protection is required for certain operations, use a NIOSH approved air-purifying respirator.

SKIN PROTECTION: Use protective clothing chemically resistant to this material. Selection of specific items such as faceshield, gloves, boots, apron, or full body suit will depend on operation. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly.

EYE/FACE PROTECTION: Use safety glasses.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: >302°F (150°C) initial
VAPOR PRESSURE: 0.1 mm @ 37.8°C (kerosene)
VAPOR DENSITY: >1
SOLUBILITY IN WATER: Emulsifies
SPECIFIC GRAVITY: 1.08
APPEARANCE: Amber liquid
ODOR: Kerosene-like

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Combustible. Avoid sources of ignition if temperature is near or above flash point. Stable under normal storage conditions.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID)
Acid, base, and oxidizing material.

HAZARDOUS DECOMPOSITION PRODUCTS: Nitrogen oxides, hydrogen chloride, and phosgene may result under fire conditions.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

MUTAGENICITY: For triclopyr BEE, in-vitro and animal mutagenicity studies were negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5). Measured log octanol/water partition coefficient (Log Pow) is 4.09. Log air/water partition coefficient (Log Kaw) is -4.0.

DEGRADATION & PERSISTENCE: Biodegradation under aerobic static laboratory conditions is moderate (BOD20 or BOD28/ThOD between 10 and 40%).

ECOTOXICOLOGY: Material is highly toxic to aquatic organisms on an acute basis (LC₅₀/EC₅₀ is between 0.1 and 1 mg/L in most sensitive species).
Acute LC₅₀ in rainbow trout (*Oncorhynchus mykiss*) is 0.8 – 4.9 mg/L.
Acute LC₅₀ for fathead minnow (*Pimephales promelas*) is 2.2 - 6.3 mg/L.
Acute LC₅₀ for water flea (*Daphnia magna*) is 2.2 mg/L.
Acute LC50 in bluegill (*Lepomis macrochirus*) is 2.1 mg/L.
Growth inhibition EC₅₀ in green alga (*Selenastrum capricornutum*) is 13.3 - 16.8 mg/L.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: Excess wastes that cannot be used according to label instructions must be disposed of according to all applicable federal, state, or local procedures.

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MATERIAL SAFETY DATA SHEET



GARLON* 4 HERBICIDE

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

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14. TRANSPORT INFORMATION:

U.S. DEPARTMENT OF TRANSPORTATION INFORMATION

FOR ALL PACKAGE (NON-BULK) SIZES SHIPPED BY AIR, LAND OR WATER:

Material is not regulated for transportation.

FOR BULK SHIPMENTS BY LAND:

COMBUSTIBLE LIQUID, N.O.S. (CONTAINS KEROSENE)/COMBUSTIBLE LIQUID/NA1993/PGIII

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard
A delayed health hazard
A fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
Proprietary Ingredient	Proprietary	PA1 NJ3
Kerosene	008008-20-6	PA1 NJ3

NJ3=New Jersey Workplace Hazardous Substance (present at greater than or equal to 1.0%).

PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Health	2
Flammability	2
Reactivity	1

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): To the best of our knowledge, this product contains no chemical subject to reporting under CERCLA.

16. OTHER INFORMATION:

MSDS STATUS: Revised Sections: 3, 4, 7, 8, 10, 12, & 14
Reference: DR-0196-5102
Replaces MSDS dated: 9/9/99
Document Code: D03-102-002
Replaces Document Code: D03-102-001

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult Dow AgroSciences for Further Information.

*Trademark of Dow AgroSciences

APPENDIX D

PUBLIC REVIEW COMMENTS

The Draft Environmental Assessment was made available for public review from September 9 through October 11, 2005. Notices were provided in the Albuquerque Journal and the New Mexican newspaper. Copies were made available at the Albuquerque Public Library (Albuquerque), Bernalillo Roosevelt Public Library (Bernalillo), Esther Bone Memorial Library (Rio Rancho) and the Santa Fe Public Library (Santa Fe). Notices were also mailed to a mailing list of adjacent property owners and interested parties (see Section 5.3). Notices were also e-mailed to a list compiled from the sign-in sheet of the public meeting held in 2003. Some notices were returned but many of the participants on this list also received mail notification. A public meeting was held at the Turquoise Trail Elementary School in Santa Fe, New Mexico on September 22, 2005. Public comments and Corps responses are included in Appendix D.

From: Gabriel Cosyleon [mailto:gcosyleon@sdutilities.com]
Sent: Friday, October 07, 2005 4:40 PM
To: Hummel, Ondrea C SPA
Subject: Corps of Engineers' EA for Galisteo Dam Project

Ondrea,

I have attached comments for the EA done by the Corps.

Thank you,

Gabe

Gabriel B. Cosyleon
Ecologist
Santo Domingo Tribe
P.O. Box 70
Santo Domingo Pueblo, NM 87052
Phone: 505-465-0055
Fax: 505-465-0056

Comments for the Galisteo Dam and Reservoir Salt Cedar Eradication Project

1. If the Corps proceeds with burning the extracted trees in the dam basin as indicated in the opening paragraph and on page 7 of the Environmental Assessment, the Natural Resources Branch has concerns of ash being transported through the Pueblo in the Rio Galisteo to the Rio Grande in the event of a large water flow or flashflood. Although water usually passes through the dam easily, if high volumes, if water were to "back-up" in the basin, ash may become suspended in the water and flow downstream negatively impacting water quality in the Rio Grande on tribal lands. Diminished water quality in the Rio Grande may have adverse ramifications in our ongoing restoration projects, as well as other users downstream.
2. In the recent soils assessment, "Retained Sediment Characterization: Galisteo Reservoir, Santa Fe County, New Mexico", what was the sampling scheme used to characterize the soils and why were only metals selected for analysis? Upon notification of the core samples that were to be taken, we were told that organics and inorganic compounds were going to be assessed.
3. The soils assessment is not available as mentioned in the EA. Draft EA release was September 9, 2005, and report was found to not be available September 27, 2005, when requested.

4. On sections 5.2 Consultation and Coordination, the Tribe was unaware of an EA being prepared. We were only aware of the need for soil samples to be taken, we did not know they were for an EA.

Gabriel B. Cosyleon
Ecologist
Santo Domingo Tribe
P.O. Box 70
Santo Domingo Pueblo, NM 87052
Phone: 505-465-0055
Fax: 505-465-0056

Corps response:

1. The following information was added to Section 3.4 on page 15: Ash would be generated from the piles of debris that would be burned. By burning the debris in the piles away from the creek bed or in a hole as proposed in Section 2.1, a majority of the ash should remain on site. By employing this methodology as well as using a silt fence adjacent to the Creek (as discussed below), ash should not be transported into the Creek bed.
2. The following information was added to Section 3.15: The "Retained Sediment Characterization Work Plan" that was used to determine what analysis to be performed is also available upon request.
3. The Assessment was mailed once it was available.
4. The DEA is part of the consultation with the Tribe.

Hummel, Ondrea C SPA

From: El Mojo [elmojo@cnsr.com]
Sent: Monday, October 10, 2005 6:35 PM
To: Hummel, Ondrea C SPA
Cc: RIII; Sunstar Herbs
Subject: A.C.E. Draft EA

Dear Ondrea,

After our meeting, and having read your Draft EA, I have come to the conclusion that the A.C.E. should pursue the "No-Action" option. I find no conclusive evidence assuring us that the toxins you plan to introduce will not have unintended consequences. I think further study of the impact of these chemicals is required in order to make the right decisions. New Mexico is rife with areas where these toxins have already been used. Do you know what impact these chemicals had on the soil and water below the dam? I know the ACE did not do that job, but it's not too far to go to see the results of the use of poison on the water, soil and wildlife there. We have read a lot of the same research you have read, and we find a lot of ambiguity and very little hard data to support the use of toxins, a lot of "may be's, could be's" etc. I think it is unwise to proceed with this project based on this kind of speculation.

As far as pulling up the trees is concerned, I think the "birds eye view" picture on the cover of your EA says it all. If I were a bird flying over the area, I would definitely prefer the salt cedar forest above the dam, over the burnt out toxic area below the dam. So please, consider the "No Build Option" until you have more conclusive evidence that any of this proposal is actually necessary. There were a lot of unanswered question at the meeting we just had. I sincerely hope we can take the time to work out a solution that is satisfactory to all. As you are probably aware, the majority of the residents in the area are still very much against the use of herbicide at all. I think it's a good time to do a feasibility study on a more sustainable earth friendly approach to the problem of those [Galisteo] dammed salt cedars. Yours truly.....Dennis Overman

Corps response:

The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts.. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

10/11/2005

Hummel, Ondrea C SPA

From: El Mojo [elmojo@cnsps.com]
Sent: Monday, October 10, 2005 6:32 PM
To: Hummel, Ondrea C SPA
Cc: RIII; Sunstar Herbs
Subject: Re:Draft EA/ Galisteo Dam Project

US Army Corps of Engineers
 Albuquerque District
 Attn: Ondrea Hummel

Dear Ms. Hummel,

Regarding the Draft EA:

I believe that the no-action alternative is still the preferred option for the overall health of all members of the existing Galisteo dam ecosystem. However, if the ACE pursues eradication alternatives, the community response to the 2003 public meetings was unequivocal in that the use of herbicides is not acceptable. Your new proposal calls for the use of Garlon, Arsenal, and Round-Up to augment mechanical extraction methods and treat resprouts.

I do not think that a review of Dow's MSDS for Garlon demonstrates that it does no lasting harm to the environment. This MSDS specifically describes hazards related to exposure and direct application of the compound rather than providing long term environmental and toxicology data. Neither am I reassured by Section 3.18 of the Draft EA. I find inconsistencies in the information presented there and was unable to find verification of statements made in that section from any primary research sources, independent or otherwise.

Also, many of the statements made in Section 3.18 contradict other sources that I have reviewed. Though these discrepancies are too numerous to go into individually here, there are several striking points that bear directly on stated project outcomes. Here are a few concerning your preferred herbicide, Garlon.

1. Persistence of Triclopyr in the soil:

The 46 day half life number quoted in the statement presumes optimal environmental conditions for the breakdown of Triclopyr, which include warm, moist soil. Since this proposed work would be done in the fall and winter months, these real-life conditions will likely make the breakdown period considerably longer.

2. Effect of soil components on Triclopyr run off:

The information provided in the report about soil type, structure, and composition at the site does not appear to rule out the possibility of percolation of Triclopyr down through the soil and eventual seepage underneath the dam.

3. Breakdown of Triclopyr:

One of Triclopyr's metabolites, TCP, is very mobile in a variety of soils, is a more persistent compound than Triclopyr itself, and has been shown to be toxic to soil bacteria. In addition, some research studies have implicated TCP in disruption of neural development in lab animals, at concentrations as low as 0.2 ppm.

4. Inhibition of mycorrhizal fungi in the soil:

No mention was made in your report about the demonstrated inhibition of the growth of mycorrhizal fungi in soil treated with Triclopyr. As you know, a healthy mycorrhizal community is essential for revegetation at the site.

If the point of this project is to encourage a more diverse plant community than currently exists at the site, the use of these herbicides will not further the purported goal.

The use of goats to control resprouts after mechanical extraction is a viable alternative to herbicide use. Organic farmers with goats in the vicinity have expressed strong interest in being involved in the project. We urge you to

10/11/2005

pursue this non-poisonous option.

Also, if the ACE's final decision is to remove all these trees, why not make them available to the community to be used as firewood (or other uses) and put those carbon emissions to good use rather than burning them onsite?

Thank you for your consideration,

Eileen Overman
PO Box 125
Cerrillos, NM 87010
10/10/05

Corps response:

The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

Specific questions/responses:

1. The breakdown time is what is listed on the product label and MSDS sheets. Site specific breakdown time can be variable depending on climate and other factors.
2. As stated in the EA in Section 3.18, the potential for leaching depends on a number of factors but the potential for leaching under normal conditions is low.
3. There may or may not be natural mycorrhizal fungi in the soil at this location. Prior to seeding with native grasses, mycorrhizal fungi is commonly applied to the site to assist with soil health. This has been added to Section 2.1.
4. Some wood would be made available for fuel wood as stated in Section 2.0, page 8.

10/11/2005

Hummel, Ondrea C SPA

From: Herwig Schoen [alicitanm@indra.com]
Sent: Tuesday, September 27, 2005 9:19 AM
To: Hummel, Ondrea C SPA
Subject: Eradication of salt cedars

It has come to my attention that the US Army Corp of Engineers is considering using herbicides for eradication of salt cedars by the Galisteo Dam and Reservoir. I do NOT support the use of herbicides in the attempted eradication of salt cedars by the Galisteo Dam and Reservoir. I do support the use of goats to eat the resprouts.

Alice Griffin
--
Alice Griffin
Reconnective Therapy
12 Rockridge Road
Cerrillos, NM 87010
505-820-2200
info@reconnectivetherapy.com
www.reconnectivetherapy.com

Corps response:

The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

Hummel, Ondrea C SPA

From: Henry K Gilman [hkg003@nets.com]
Sent: Tuesday, September 27, 2005 9:04 AM
To: Hummel, Ondrea C SPA
Subject: Don't use herbicides for salt cedar control

As a resident of the Galisteo area for more than 13 years, I am strongly opposed to the use of spraying herbicides in the attempted eradication of salt cedars by the Galisteo Dam and Reservoir.

Please consider the alternative of goats to eat the resprouts.

Sincerely,

Henry Gilman

PO Box 261 Cerrillos NM 87010
505-424-9308

.....

Real Communication

Alyson J Gilman . 505-690-2611
PO Box 261 . Cerrillos, NM, 87010

Corps response:

The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

9/27/2005

Hummel, Ondrea C SPA

From: Alexis Pilialoaeku'upu'uwai Higginbotham [alexish8@earthlink.net]
Sent: Friday, September 23, 2005 8:29 AM
To: Hummel, Ondrea C SPA
Subject: Galisteo Dam Project

Dear Ms. Hummel:

My husband and I are *adamantly opposed to the USACE using herbicides* of any sort to eradicate the salt cedars at the Galisteo Dam and Reservoir. The use of goats to manage the resprouts is the way this community would like the problem to be treated.

I cannot fathom you telling us that the use of goats would be more expensive than buying herbicides from chemical companies who like to make lots of money and then renting planes to spray them all over the place. Cost shouldn't be as big a factor as safety, and the point is that no matter how safe you say these herbicides are, they are still not as safe as the use of goats.

I searched all over your USACE website and wasn't able to find any information about this upcoming project to share with other residents. If it wasn't for someone telling me about last night's meeting, I would never have known about it.

I feel very strongly that residents should have been more adequately informed about last night's meeting and should have been given an opportunity to weigh in, especially when you're presenting an option as controversial as spraying herbicides. You were working off an email list that was old, so very few people showed up. This community is very active, but you didn't give most of them a chance to even learn what's going on.

I would appreciate it if you could email me with the page in your website that would discuss this project.

Thank you.

Alexis Higginbotham and Archie Tew

Corps response:

The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

As stated at the beginning of this Appendix, notification of the availability of the Draft Environmental Assessment was advertised in many venues.

Hummel, Ondrea C SPA

From: Carole Jackson [carolej-nm@earthlink.net]
Sent: Sunday, September 25, 2005 10:33 AM
To: Hummel, Ondrea C SPA
Subject: Please no spraying

No herbicides to get rid of salt cedar in the Galisteo Dam area. There are more natural ways to take care of the problem.

Carole Jackson
(505) 424-9781
carolej-nm@earthlink.net

"Intelligence can build a bomb, but wisdom would never think to do so." Sharon Shane

Corps response:

The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

9/26/2005

GOVERNOR
Bill Richardson



DIRECTOR AND SECRETARY
TO THE COMMISSION
Bruce C. Thompson

STATE OF NEW MEXICO DEPARTMENT OF GAME & FISH

One Wildlife Way
Post Office Box 25112
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Fax: (505) 476-

Visit our website at www.wildlife.state.nm.us
For basic information or to order free publications: 1-800-862-9310.

STATE GAME COMMISSION
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Alfredo Montoya, Commissioner
Alcalde, NM

David Henderson, Commissioner
Santa Fe, NM

Peter Pino, Commissioner
Zia Pueblo, NM

Leo Sims, Commissioner
Hobbs, NM

M. H. "Dutch" Salmon, Commissioner
Silver City, NM

September 27, 2005

Ms. Ondrea Hummel
U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, New Mexico 87109-3435

Re: Draft Environmental Assessment for the Galisteo Dam and Reservoir Salt Cedar Eradication Project
NMGF No. 10344

Ms. Hummel:

In response to your letter dated September 8, 2005, regarding the above referenced project, the New Mexico Department of Game and Fish (Department) would like to comment on information presented in the Draft Environmental Assessment (EA).

The EA states that long-term benefits of the proposed project include potential water savings. The Department believes that the Corps of Engineers should incorporate findings of recently published articles on water use by saltcedar (Glenn and Nagler 2005, Shafroth et al. 2005). Recent published reviews of scientific evidence on the use of water by saltcedar (Glenn and Nagler 2005, Shafroth et al. 2005) do not support the contention that removal of saltcedar will result in increased availability of water. According to the review by Glenn and Nagler (2005), annual rates of saltcedar evapotranspiration at the stand level are within the range measured for cottonwoods, and rates vary depending upon water availability and salinity of the substrate. If water salvage is the goal, replacing saltcedar with some native plants (e.g., cottonwood and willow) may actually increase evapotranspiration (Glenn and Nagler 2005). According to the New Mexico Interagency Weed Action Group, quantifying the hydrologic response to exotic tree management will require an understanding of the general influences of the hydrological cycle. They state that there are large uncertainties with current estimates, especially for evapotranspiration and surface/ground water interactions. The key will be to determine if long-term exotic tree removal and restoration efforts will increase water availability. Increased water availability would first affect ground water recharge and water table depths. Depending on the geohydrology of a site and interaction of ground water with surface water, increased water availability might never be measurable in surface flow. The Department encourages the Corps to monitor and document changes in depths to the water table, changes in soil moisture, changes in stream flow, vegetative response and wildlife diversity and density following saltcedar removal. Clear success criteria, related to project objectives and potential benefits, should also be established prior to project implementation.

The EA states that birds prefer to nest in native vegetation, and that saltcedar provides little food value for native wildlife species. While these statements are true, the Department recommends that the Corps be aware of recent published information on the use of saltcedar by wildlife (Shafroth et al. 2005). Bird use of saltcedar has been documented along the Pecos River (Hunter et al. 1988) and the Middle Rio Grande (Ellis 1995). In New Mexico, the Pecos and Rio Grande valleys represent distinctly different riparian areas. The Pecos valley was "largely devoid of mature riparian vegetation before the appearance of salt cedar" (Hunter et al. 1988). However, the Rio Grande valley corridor was dominated by willow species and mature cottonwoods. The invasion of tamarisk species into

both river valleys has altered the habitat and use patterns of avian species. In the Pecos valley, "the number of breeding bird species currently using saltcedar would suggest that bird species expanded into and within the valley with the spread of saltcedar" (Hunter et al. 1988). Breeding bird surveys in the Pecos River Valley of New Mexico indicate that saltcedar provides habitat to numerous avian species including mourning dove, yellow-billed cuckoo, blue grosbeak, and painted bunting (Hildebrandt and Ohmart 1982). In the Pecos River valley, it is unlikely that any other woody species would replace saltcedar, thereby displacing numerous birds and decreasing the diversity of bird species in the area.

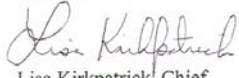
The Department supports the maintenance of resprouts through herbicide treatment in Years 2-5. Re-sprouting and germination of seed left in the soil and washed into the project area from upstream will result in new growth of saltcedar that will require repeated control. Since the project cannot address the underlying hydrologic changes that caused the replacement of native species with non-native species in the reservoir, repeated treatment will be necessary.

As regards state special status animal species that may be impacted by this proposed project, Section 3.10 adequately addresses species concerns.

The following comments are mostly editorial in nature. On Page 20, the paragraph that discusses sediment movement appears to be out of place. Sediment movement may be promoted by removal of saltcedar along banks of the Rio Galisteo due to natural de-stabilization during high flows. On Page 25, the second paragraph states that infestation of weedy species will "be monitored". The Department wants to make sure the statement also includes "treatment as necessary", which is implied. This paragraph includes the statement "...to establish after spraying of the salt cedar." Is this a typographical error? On Page 26, the technical description of Triclopyr includes the statement that it is toxic to many plants. This statement appears to contradict the pros and cons on page 27 that state that Garlon "affects only non-native vegetation". Are these statements contradictory, or are they both referring to non-native species?

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Galisteo Dam and Reservoir Salt Cedar Eradication Project. If you have any questions, please contact Randy Floyd at (505) 476-8091 or randy.floyd@state.nm.us.

Sincerely,


Lisa Kirkpatrick, Chief
Conservation Services Division

LK/rif

xc: Susan MacMullin, New Mexico Ecological Services, USFWS

References Cited

- Ellis, L.M. 1995. Bird use of saltcedar and cottonwood vegetation in the Middle Rio Grande valley of New Mexico, U.S.A. *J. Arid Envir.* 30:339-349.
- Glenn, E.P. and P.L. Nagler. 2005. Comparative ecophysiology of *Tamarix ramosissima* and native trees in western US riparian zones. *Journal of Arid Environments* 61:419-446.
- Hildebrandt, T. D. and R. D. Ohmart. 1982. Biological Resource Inventory (Vegetation and Wildlife), Pecos River Basin, New Mexico and Texas. Final Report to Bureau of Reclamation, Contract No. 9-07-57-V0567.
- Hunter, W.C., R. D. Ohmart, and B. W. Anderson. 1988. Use of exotic Saltcedar (*Tamarisk chinensis*) by birds in arid riparian systems. *The Condor* 90:113-123.
- Shafroth P.B., J.R. Cleverly, T.L. Dudley, J.P. Taylor, C. Van Riper III, E.P. Weeks, and J.N. Stuart. 2005. Control of *Tamarix* in the Western United States: Implications for Water Salvage, Wildlife Use, and Riparian Restoration. *Environmental Management* 35:231-246.

Corps response:

1. In regard to the discussion of potential water savings, many authors have stated that this is a possibility (see Section 1.1 on page 1). Of course, in many instances this is site specific and must be measured to make this quantification. Unfortunately, there are not funds available to install groundwater wells as encouraged. We will, however, continue to monitor the wells at the base of the Dam which measures groundwater when the Creek is flowing. Also, when replanting with native species, mainly willow and other shrubs would be used. Cottonwood is not a major tree in this area as it is in other areas of the Middle Rio Grande basin, and therefore would only be planted in limited quantities.
2. Paragraph 3 in Section 3.17 on page 27 has been revised in relation to your comments on weedy species.
3. In relation to your question of toxicity by Garlon to plants, both statements are referring to non-native plants since that is what Garlon targets.

U.S. Army Corps of Engineers
Environmental Resources Section
Attn: Ondrea Hummel
4101 Jefferson Plaza NE
Albuq., NM 87109
Email: "Hummel, Ondrea C SPA" <Ondrea.C.Hummel@spa02.usace.army.mil>,
Douglas.R.Bailey@spa02.usace.army.mil

Electronically delivered October 8, 2005

Re: Draft Environmental Assessment Galisteo Dam & Reservoir Salt Cedar Eradication & Restoration Project--
Comments from Ross Lockridge

Dear Ms. Hummel,

Below are my comments and recommendations.

Sincerely,

Ross Lockridge
PO Box 22
Cerrillos, NM 87010
RILI <murlock@raintreecounty.com>

These comments favor the use of goats as a follow-up treatment to resprouts, and are in opposition to the use of any herbicide for this purpose. Of the two follow-up options presented, the later use of herbicide, appears to be favored in the DRAFT Environmental Assessment (EA) do to the lack of details on how the use of goats would be managed.

Although the DRAFT EA's preferred action, mechanical extraction, is far better than aerial application of herbicides, the proposed use of hand applied herbicide as a follow-up treatment is still disturbing in light the on-going discoveries of the severe toxic effects to the biosphere of herbicides that were once assured by their makers as safe. More on these discoveries below.

Since there are alternatives that can be committed to that are clearly safer than the use of herbicide, a *precautionary principle* can and should be applied to commit to, 1) the use of goats, or 2) opt for the No-Action alternative. Both of these would, at worst, let nature follow its own genetic logic without accidentally targeting species into endangerment or extinction. Beloved native vegetation, like cottonwood, are after all, not endangered, but preferred. Diversity can be encouraged, but at what cost?

THE PRECAUTIONARY PRINCIPLE (Raffensperger, Montague, and others) says, "When an activity raises threats of harm to human health or the environment, precautionary measures shall be taken, even if some cause-and-effect relationships are not fully established scientifically". "The precautionary principle always inquires about alternatives. Is there a less dangerous option?" "The precautionary principle advocates zero degradation of the environment because of the uncertainty of risk assessment. Why? The webs of ecological relationships are too complex for science totally to disentangle."
<http://www.bioneers.org/programs/books/reviews.php>

There are 3 herbicides mentioned for use in the EA: Garlon 4, and Arsenal mixed with Round-up.

The worldwide die-off of amphibians has been partly attributed to the "properly applied" and "safe" Monsanto herbicide, Round-up (see article, study & discussions in the NOTES). The EA notes that Round-up mixed with Arsenal "is successful". This is evidence that more caution within the Draft EA is needed. What don't we yet know about Garlon 4 and Arsenal?

A disturbing quote apropos from the EA: "Based on test results submitted to the EPA *BY THE MONSANTO* and American Cyanamid companies, this herbicide [Arsenal], when properly applied, should pose minimum risks to representative wildlife species occurring in the area." EA,p. 26 [Emphasis added]. Here the fox has left the den and entered the EA.

If the use of goats (one option in the eradication of resprouts) fails, the EA will have both Garlon 4 and Arsenal as fall-back. There are no details in the EA on how the use of goats would be managed. With no commitment or oversight, there is enhanced the chance that the use of goats would fail. Goats would be used "if available". On the other hand, just how the use of herbicides would be managed is in comparison, proscribed.

RECOMMENDATION: I would like to see a real commitment in the EA to use goats. This should be a well thought out plan that minimizes failure, and that does not pit the chemical industries against a healthier nontoxic agricultural solution. As a precaution, the Army Corps should call for zero herbicide use here since there are other alternatives that can be committed to that are clearly safer: 1) the use of goats, or, 2) the No-Action alternative.

NOTES

1. Some quotes from the EA apropos to this discussion:

"Phase 11: Maintenance of resprouts Mechanical extraction allows for removal of all parts of the trees though some root pieces are bound to remain after treatment, allowing for some resprouting to occur. Resprouts, would be monitored and treated 1-2 times a year with either a backpack-mounted sprayer with herbicide inside (Garlon 4 is the preferred chemical) or by use of goats (depending on availability)." p. 7

"3.18 ...Use of herbicide application was evaluated for each of the alternatives. Garlon 4 is the preferred herbicide to use. Arsenal (imazapyr) was also evaluated and would be used in some cases." P. 25.

"It has been found by other agencies in the area currently using these herbicides . . . that both Garlon 4...or Arsenal (mixed with Round-up) have been successful." p. 27

"Garlon 4...Hazardous Identifications:... Toxic to aquatic organisms." p. 40

"Garlon 4...Ecotoxicology: Material is highly toxic to aquatic organisms on an acute basis...." pp.3

2. Article: Monsanto's Roundup Herbicide Killing Off Frogs Worldwide

<http://www.commondreams.org/cgi-bin/print.cgi?file=/news2005/0808-08.htm>

FOR IMMEDIATE RELEASE:

AUGUST 8, 2005, 3:15 PM

CONTACT: GM Watch Daily

Karen Hoffman, University of Pittsburgh, 412-624-4356

PITTSBURGH - August 8 [2005] - As amphibians continue to mysteriously disappear worldwide, a University of Pittsburgh researcher may have found more pieces of the puzzle. Elaborating on his previous research, Pitt assistant professor of biological sciences Rick Relyea has discovered that Roundup(r), the most commonly used herbicide in the world, is deadly to tadpoles at lower concentrations than previously tested; that the presence of soil does not mitigate the chemical's effects; and that the product kills frogs in addition to tadpoles.

In two articles published in the August 1 issue of the journal Ecological Applications, Relyea and his doctoral students Nancy Schoeppner and Jason Hoverman found that even when applied at concentrations that are one-third of the maximum concentrations expected in nature, Roundup(r) still killed up to 71 percent of tadpoles raised in outdoor tanks.

Relyea also examined whether adding soil to the tanks would absorb the Roundup(r) and make it less deadly to tadpoles. The soil made no difference: After exposure to the maximum concentration expected in nature, nearly all of the tadpoles from three species died.

Although Roundup(r) is not approved for use in water, scientists have found that the herbicide can wind up in small wetlands where tadpoles live due to inadvertent spraying during the application of Roundup(r).

Studying how Roundup(r) affected frogs after metamorphosis, Relyea found that the recommended application of Roundup(r) Weed and Grass Killer, a formulation marketed to homeowners and gardeners, killed up to 86 percent of terrestrial frogs after only one day.

"The most striking result from the experiments was that a chemical designed to kill plants killed 98 percent of all tadpoles within three weeks and 79 percent of all frogs within one day," Relyea wrote.

Previous studies have determined that it is Roundup(r)'s surfactant (polyethoxylated tallowamine, or POEA, an "inert" ingredient added to make the herbicide penetrate plant leaves) and not the active herbicide (glyphosate) that is lethal to amphibians.

This research was funded by the National Science Foundation, Pitt's McKinley Fund, and the Pennsylvania Academy of Science.

3. FURTHER READING on NonTargeted organisms & Round-up:

--[THE STUDY:] "This study represents one of the most extensive experimental investigations of pesticide effects on aquatic communities and offers a comprehensive perspective on the impacts of pesticides when nontarget organisms are examined under ecologically relevant conditions.

<http://www.esajournals.org/esaonline/?request=get-abstract&issn=1051-0761&volume=015&issue=02&page=0618>

--[Dr. Relyea responds to Monsanto's concerns:] "A recent paper in Ecological Applications (Relyea 2005a) has demonstrated highly lethal effects of the herbicide Roundup® on amphibians.

A brief description of the Relyea (2005a) study: "To determine the effect of Roundup on tadpoles in ponds, Relyea (2005a) added Roundup to pond mesocosms (1000-liter outdoor tanks that contained algae, zooplankton, snails, tadpoles, and several species of insect predators). After two weeks, we went back and determined how many tadpoles survived. The result was widespread death for many of the amphibian species when exposed to Roundup compared to amphibians in the control tanks. Furthermore the death rate was much higher than expected based on previous studies of Roundup."

<http://www.pitt.edu/~relyea/Roundup.html>

--"Unfortunately, it looks like frogs don't have a Roundup-ready gene, which is too bad considering they have no choice but to live and breed in watersheds and ...

<http://www.gmwatch.org/print-archive2.asp?arcid=5068>

--ROUNDUP KILLS FROGS, MAY EXPLAIN GLOBAL DECLINE "A study published by a University of Pittsburgh researcher finds that Roundup, the herbicide most commonly ...

<http://www.gmwatch.org/archive2.asp?arcid=5079> -

--"Pitt assistant professor of Biology Rick Relyea found that Roundup is extremely lethal ... Leopard frog tadpoles and gray tree frog tadpoles were completely ...

<http://www.gmwatch.org/print-archive2.asp?arcid=5079>

Corps response:

1. The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

Hummel, Ondrea C SPA

From: RIII [murlock@raintreecounty.com]
Sent: Monday, October 10, 2005 8:57 PM
To: Hummel, Ondrea C SPA; Bailey, Douglas R SPA
Cc: murlock@raintreecounty.com
Subject: Attn: Ondrea Hummel from Ann Murray, Re: Draft EA Galisteo Dam & Reservoir Salt Cedar Eradication & Restoration Project

Importance: High

Comment on DRAFT Environmental Assessment - - October 10, 2005

U.S. Army Corps of Engineers
Environmental Resources Section
Attn: Ondrea Hummel
4101 Jefferson Plaza NE
Albuquerque, NM 87109
Email: "Hummel, Ondrea C SPA" <Ondrea.C.Hummel@spa02.usace.army.mil>,
Douglas.R.Bailey@spa02.usace.army.mil

Re: Draft Environmental Assessment Galisteo Dam & Reservoir Salt Cedar Eradication & Restoration Project--Comments from Ann Murray

Dear Ms. Hummel,

Regarding Salt Cedar Eradication at the Galisteo dam. I've attended your presentations on this matter since its conception and followed this issue. I've visited the site and walked the river. I've lived on the Galisteo River for 32 years.

1. I like salt cedar trees and I would not like to see them eradicated, which can't be done anyway. Shall I praise the beauty of their luminous red sticks (I use them all the time) and the honey from the blooms that they give when no others are blooming from drought... their pink flowers, their plumage and the fiery orange that it turns in the Fall? I think they are very smart trees.
2. Please commit to using goats for follow-up clearing after mechanical removal.
3. Use no herbicides what-so-ever.
4. Please put the large wood up for firewood, chip and compost the rest. Soil in NM always needs mulch.
5. Recycle, don't burn on site. Leave no ashes.
6. Then I will wish you good luck on the reclamation needed due to the dam.
7. Please don't come up the river.

Please acknowledge receipt of this letter and print it for the record.

Thanks,

Ann Murray
PO Box 22
Cerrillos, NM 87010

Corps response:

- 1-3. The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.
4. Some wood would be made available for fuel wood as stated in Section 2.0, page 8.
5. Burning is discussed in Section 2.0 as well. Ash was discussed in Section 3.4, page 15.

Hummel, Ondrea C SPA

From: Jan Olsen [Janolsen@Cybermesa.com]
Sent: Saturday, September 24, 2005 8:09 AM
To: Hummel, Ondrea C SPA
Subject: no pesticides please

Dear Ms. Hummel,
Please consider a non-toxic method to eradicate the salt cedars in the Galisteo Basin. Our government officials need to begin to check the research on cancer and birth defects and chronic pulmonary diseases to name a few. Prevention should be a consideration for health care costs. Goats will do the trick.
Respectfully yours,

Jan Olsen,
Resident CR 42
Santa Fe County

Corps response:

The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

9/26/2005

Hummel, Ondrea C SPA

From: Thor Sigstedt [adventuretrails@earthlink.net]
Sent: Thursday, October 06, 2005 9:49 AM
To: Hummel, Ondrea C SPA
Subject: goats and salt cedar, etc.

Dear Ondrea,

I am a long time resident of the Galisteo Watershed and have lived along the Galisteo Creek near Canoncito for over 26 years. I have watched the salt cedar populations along our 1/2 mile stretch of the creek with great interest over the years. The stands on our property near or on the creek have not grown appreciably in all these years and they coexist with the other species including cottonwood and willow and grasses, etc. quite well. In fact, the ones I have transplanted to incorporate into our domestic landscaping are pretty much overwhelmed by the other species around them, including cedars, douglas fir, etc. I see almost no generation by seeds and very little by shoots. I suspect that our climate is perhaps less suited to their quick regeneration somehow, but my experience is real and I have to go by it in order to think clearly. I have recently discovered that the evapotranspiration rates as studied by numerous scientists and universities now show clearly that the salt cedar does not suck up more water than the other species including willow and salt cedar, dispelling the huge disservice done by rumor for many years, and that it actually uses water more efficiently because it reopens its stoma more slowly when light returns and photosynthesizes more slowly also. Hmmm. I have done controlled grazing on my land for all these years also and have noticed that my donkey eats many species, including willow, cottonwood, pines, russian olives, etc. etc, but to my knowledge has never touched the salt cedar. I suspect that this is the biggest reason for its taking over in many places: grazing patterns by numerous species that don't eat salt cedar and will eat all the plant life around the salt cedar creating what looks like a salt cedar desert. I suspect cows in the Galisteo dam area have done this damage many years ago and still may be doing it. I noticed many cows in that area recently. If goats eat the salt cedar, then it seems it would be very good the work with them in controlling their growth as they would be the only animal species that I know of that eat the plant. When I got here many years ago, the place was almost denuded of cottonwood, willow and other native species. It was only by doing controlled grazing that the area was able to turn into a fabulous bosque, which incorporates many many species, including the russian olive, which is a fabulous plant provided food for birds and habitat for mourning doves and, wow, mocking birds, which we have seen more of each year. I would suggest some more experimentation with some of these concepts and discourage the use of chemicals. It is only with close contact with these species and riparian areas that any progress will be made. These species continue to take over in areas where people have abandoned the ecosystem in many ways, reaping the results of their own detachment and lack of intimate contact with the system.

Thank you for your ear and thanks for considering the use of goats.

Sincerely,

Thor V. Sigstedt

steering committee for Galisteo Watershed Partnership
member of committee to create Galisteo Creek Watershed Restoration Strategy

Thor Sigstedt
adventuretrails@earthlink.net
Why Wait? Move to EarthLink.

Corps response:

The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

Hummel, Ondrea C SPA

From: SunStarHerbs [sunstarherbs@yahoo.com]
Sent: Monday, October 10, 2005 12:16 PM
To: Hummel, Ondrea C SPA
Subject: Galisteo

Dear Ms.Hummel,

As a producer of organic food and herbs (NMOCC cert.
#304) we oppose the use of herbicides in our area (and elsewhere).
We would like to see the dam basin revitalized to enhance both grazing (perhaps to the
benefit of the Santa Domingo herd of cows) and browsing (perhaps to the benefit of our
goats).
We will not be able to use this area after any poisoning.
We are sure that if the usace puts this up to bid for goat management interest will be
shown.
We would like to see a complete management plan before any of the project is begun.

Thanking you,
Dave, Becky, and Amanita Thorp

Corps response:

The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

The grazing lease at the Dam was terminated in 2003.

A discussion of the plan to be followed is in Section 2.1. A more detailed plan for implementation of each specific task would be spelled out in a contract agreement with the implementing contractor.

Hummel, Ondrea C SPA

From: Alyson J Gilman [aly@nets.com]
Sent: Tuesday, September 27, 2005 9:00 AM
To: Hummel, Ondrea C SPA
Subject: Galisteo salt cedar control

As a resident of the Galisteo area, I do not support the use of spraying herbicides in the attempted eradication of salt cedars by the Galisteo Dam and Reservoir. Rather, I strongly support the use of goats to eat the resprouts.

Thank you,
Alyson Gilman

...

Alyson Gilman
PO Box 261 Cerrillos NM 87010
505-424-9308

Corps response:

The Proposed Action as described in Section 2.0 on page 6 has been updated to reflect the plan to use goats as an initial treatment of resprouts, but that once native vegetation has become abundant in the area, herbicide would be used to selectively treat these resprouts. Section 3.18 on page 27 on herbicide use has also been updated to show the use of Garlon only.

9/27/2005

Hummel, Ondrea C SPA

From: VY080159@cs.com

Sent: Wednesday, September 07, 2005 8:05 PM

To: Hummel, Ondrea C SPA

Subject: Re: Draft Environmental Assessment: Galisteo Dam and Reservoir Salt Cedar Era...

Great! I am in favor of having all the Salt Cedar removed in this arid state.

Vic

1/26/2006